DOCUMENT RESUME

ED 146 130 SP 011 741

AUTHOR	Milne, Ann M.; And Others
TITLE	A Study of Impact of the School Health Curriculum Project on Knowledge, Attitude and Behavior of Teenage Students.
INSTITUTION	Center for Disease Control (DHEW/PHS), Atlanta, Ga.
PUB DATE	8 Nov 75
CONTRACT	CDC 21-74-508
NOTE	217p.
EDRS PRICE	MF-$0.83 HC-$11.37 Plus Postage.
DESCRIPTORS	Affective Behavior; Behavior Patterns; Cardiovascular System; Cognitive Development; *Curriculum Research; Elementary School Students; *Followup Studies; *Health Education; Knowledge Level; *Retention Studies; Secondary School Students; Smoking; *Student Attitudes; *Student Behavior
IDENTIFIERS	Nervous System; Respiratory System

ABSTRACT

This study describes research on the impact of three intensive health curriculum models (respiratory, circulatory, and nervous systems) administered at the fifth-, sixth-, and seventh-grades on the knowledge levels, attitudes, and health behaviors of teenage students. The hypotheses of the study were that students enrolled in one or more units of the model would be statistically different after a time lapse of two to four years from students who were not enrolled. Primary expectations were that they would (1) possess more knowledge about the resoiratory, circulatory, and nervous systems, and (2) engage in more acceptable health practices designed to protect their bodies against disease. Secondary impact expectations related to smoking attitudes and behavior and to positive school-related behaviors. Problems arising in the process of conducting the study (attrition in the number of school districts and students participating, delay in gaining approval of measurement instruments, and the impossibility of conducting a true longitudinal study) imposed severe restrictions on applying the research results. However, analyses of these results supported hypothesis one, in that the greater the curriculum exposure, the higher the level of health knowledge. A significant relationship was found between curriculum exposure and health behavior scores for ninth- (but not for tenth-) grade followup study participants. No difference was found for the third hypothesis, related to smoking attitudes, though smoking behavior was found to be significantly related to curriculum exposure for ninth- (but not tenth-) graders. School-related behavior failed to vary on the basis of whether a student had or had not been enrolled earlier in the curriculum model. Tables and test instruments are presented in appendices. (MJB)

Documents acquired by ERIC include many informal unpublished materials not available from other sources. ERIC makes every effort to obtain the best copy available. Nevertheless, items of marginal reproducibility are often encountered and this affects the quality of the microfiche and hardcopy reproductions ERIC makes available via the ERIC Document Reproduction Service (EDRS). EDRS is not responsible for the quality of the original document. Reproductions supplied by EDRS are the best that can be made from the original.

Education & Public Affairs

JOSEPH G. COLMEN, PRESIDENT
1200 EIGHTEENTH STREET, N. W., SUITE 1209
WASHINGTON, D. C. 20036

SP

ED146130

A STUDY OF IMPACT OF THE SCHOOL HEALTH CURRICULUM PROJECT ON KNOWLEDGE, ATTITUDE AND BEHAVIOR OF TEENAGE STUDENTS

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

THIS DOCUMENT HAS BEEN REPRODUCED EXACTLY AS RECEIVED FROM THE PERSON OR ORGANIZATION ORIGINATING IT. POINTS OF VIEW OR OPINIONS STATED DO NOT NECESSARILY REPRESENT OFFICIAL NATIONAL INSTITUTE OF EDUCATION POSITION OR POLICY

Ann M. Milne, Ph.D.
Joanne Marshall-Mies, M.A.
Joseph G. Colmen, Ph.D.

Conducted under contract #CDC 21-74-508
Center for Disease Control
Bureau of Health Education
Community Program Development Division
Atlanta, Georgia

SP011 741

November 8, 1975

To be returned
to Roy L. Davis,
Bureau of Health
Education, CDC -
Atlanta, Georgia
30333

Education & Public Affairs
JOSEPH G. COLMEN, PRESIDENT
1200 EIGHTEENTH STREET, N. W., SUITE 1209
WASHINGTON, D. C. 20036

A STUDY OF IMPACT OF THE SCHOOL HEALTH CURRICULUM PROJECT ON KNOWLEDGE, ATTITUDE AND BEHAVIOR OF TEENAGE STUDENTS

Ann M. Milne, Ph.D.
Joanne Marshall-Mies, M.A.
Joseph G. Colmen, Ph.D.

Conducted under contract #CDC 21-74-508
Center for Disease Control
Bureau of Health Education
Community Program Development Division
Atlanta, Georgia

EPA

November 8, 1975

TABLE OF CONTENTS

page

Acknowledgements i

I. Preface: Background and Purpose of Study 1

II. Impact Research Hypotheses 5

III. Research Design and Procedure 6

IV. Results - Testing the Hypotheses 15

V. Limitations and Conclusions 37

APPENDICES

Appendix A - Development of Health Knowledge Test

Appendix B - Knowledge Test

Appendix C - School-Related Questionnaire and Health-Related Questionnaire

Appendix D - Teenagers' Self-Test: Cigarette Smoking

Appendix E - Descriptions of Scales and Items in each Scale from Teenagers' Self-Test: Cigarette Smoking

Appendix F - Tables

Appendix G - Evaluation of Norm Group for Use as Controls in Present Study

Appendix H - Parental Consent Letter

Appendix I - Instrument Reliabilities

Smoking Behavior

This measure, derived from self-reports in response to two behavior questions in the Teenage Self-Test, does not lend itself to meaningful reliability measurement except as it would be possible to obtain independent external verification of the students' behavior by reliable observers. Since such information, even if available, was beyond the scope of the study to collect, a measure of reliability for Smoking Behavior is not reported. — Cf. last page

— This would be validity

Acknowledgments

We wish to acknowledge the assistance provided in data collection by the cooperating school districts:

- Bethlehem Central Schools, Delmar, New York
- Cajon Valley Union School District, El Cajon, California
- Kanawha County Public Schools, Charleston, West Virginia
- Los Altos School District, Los Altos, California
- West Genesee Central Schools, West Genesee, New York

In particular, we are grateful for the direct personal assistance provided by Mr. Fred Burdick of Bethlehem, Ms. Margaret Wiilmon of Cajon Valley, Mr. Luther Cope of Kanawha County, Mr. Leonard Heid of Los Altos and Dr. Jack Calvert of West Genesee. It goes without saying that the research could not have been accomplished without the cooperation of hundreds of students in these locations and for that we are most appreciative.

Our working consultants provided valuable input in technical planning as well as toward selection of data analysis treatments employed. These included Dr. Ira Cisin, Director of the Social Research Group at George Washington University, and Dr. Philip H. Dubois, Professor of the Department of Psychology, Washington University, St. Louis, Missouri. Our initial technical monitor from the Center for Disease Control, Dr. Dorothy Green, participated with the external consultants in the design selection and helped to facilitate progress in numerous ways as the work proceeded. Mr. Roy Davis of the Center for Disease Control, Bureau of Health Education, served as project officer.

Within Education and Public Affairs, Dr. Ann M. Milne, served as principal investigator of Phase I of the project and for development of the design for Phase II. Ms. Joanne Marshall-Mies took over as principal investigator for completion of the analysis and report for Phase II. Ms. R. Elizabeth Stone was responsible principally for development of the Health Knowledge Test. Ms. Donna Pauletti contributed at various stages in data coding, editing and analysis, and in designing controls for the acquisition and handling of test and other materials.

Joseph G. Colmen, Ph.D.
Project Director

I. PREFACE: BACKGROUND AND PURPOSE OF STUDY

In 1967, the National Clearinghouse for Smoking and Health initiated development of a health education project directed at developing better understanding among youngsters of several of their body systems and at motivating them toward protecting themselves from disease. From this initial work, an experimental series of curriculum units was constructed and introduced in classrooms beginning in 1969. The program, originally called the Berkeley Health Project, has come to be known as the School Health Curriculum Project (SHCP).

The Curriculum Model

The health curriculum model consists of three intensive units of study--one each at the fifth, sixth and seventh grade levels comprising the respiratory, circulatory and nervous systems respectively. Each unit runs about eight to ten weeks during the school year, is comprehensive in its coverage of health education content, and involves maximal integration with other basic curriculum areas. The emphasis is on working toward the basic objectives of education, developing understanding and appreciation of the body and skills for prevention of disease, and encouraging youth to make sound decisions about personal and environmental factors that affect their own health. A wide variety of classroom education techniques and resources, material and human, is used. Considerable emphasis is placed on stimulating pupil motivation through individual and small group activity, through dealing with real life issues, and through involvement of school administrators, parents and community health personnel.

The Teacher Training Model

The Curriculum, together with highly integrated kits of specially developed materials, including games and other "fun" activities, is of course directed at maximum learning for the children enrolled in the program. The importance of the teacher is not overlooked in bringing alive the materials component.

A companion teacher training model involves two weeks of in-depth training of teams of classroom teachers and administrators and leads to establishment of two successful classroom examples of each unit at its grade level in one school of a district. Each team of trainees, in addition to developing the unit in two classrooms, is required to work with its administrators to develop and conduct similar training for other teachers at their grade level within the first year. After establishment of a "success model" at the fifth grade level, succeeding waves of teachers are trained.

Since 1969, numerous teams of teachers and administrators have been trained in school districts from New York to California and the number of children exposed to the Curriculum has expanded accordingly.

In the elementary schools, children are generally associated with only one teacher for most of the instructional program. Therefore, SHCP training and experience inherently has a capability for modifying these teachers' behavior in teaching other subjects besides health education. Self-reports by teachers suggest that changes have occurred in teacher behavior, such as allowing more freedom of choice for tasks children might perform; permitting individual and group activity; and providing for open discussion of problems. The impact of change in teaching strategies has the potential for going well beyond SHCP to the teaching of all subjects and to the teaching of all children.

Community Involvement

The successful SHCP program includes a significant amount of community involvement, starting with parents and going well beyond to members of the health and medical professions, fire departments, industrial and business representatives, and private voluntary agencies. By their involvement, schools and communities enable the instruction to be better related to the real world of the students; and in the case of parents, the health education of children can influence the adults as well. Reports by teachers involved in the program often cite this kind of impact, seldom found in other instructional programs or modalities.

Purposes of the Evaluation Research

Notwithstanding the potential impact of participating in SHCP on a broad base of target groups, i.e., teaching behavior, school administration policies, parent behavior, and community group involvement, the purpose of this research study was narrowly defined to be a systematic, objective assessment of the long-range impact of the Curriculum of only one of these target groups, the students who were enrolled in it.

For purposes of this study, i.e., to measure student effects of the Curriculum, primary "impact" on students was defined as (a) effect on health knowledge about the body systems covered, and (b) effect on health-related behavior, that is, the students' own health practices in protecting the body from disease. Secondary "impact" on the student was explored in terms of (c) effect on attitudes related to cigarette smoking, (d) effect on smoking behavior, and (e) effect on school-related behavior, that is, motivation toward health and science interests and engaging in positive learning practices.

It is important for the reader to be reminded that the research was not directed at measurement of the total range of possible impacts beyond students, to teachers, school administrators, parents and relevant segments of the community at large. Other study limitations due to operational procedures and the realities of field research are described in Section S, Limitations and Conclusions.

2. IMPACT RESEARCH HYPOTHESES

Expectations regarding the potential long-range impact of SHCP were translated into impact hypotheses which could be tested by experimental means.

> Students enrolled in one or more units of the Curriculum will be statistically different after a time lapse of two to four years from students who were not enrolled:
>
> Primary impact expectations
>
> 1. They would be expected to possess more knowledge about the respiratory, circulatory and nervous systems.
> 2. They would be expected to engage in more acceptable health practices designed to protect their bodies from disease.
>
> Secondary impact expectations
>
> 3. They would be expected to hold more negative attitudes toward cigarette smoking and more positive attitudes toward non-smokers.
> 4. They would be expected to engage less in cigarette smoking behavior.
> 5. They would be expected to display more positive school-related behavior in terms of study habits, use of resources, and the like.

While the research was conducted in two phases, for the convenience of the reader the findings from both are combined in the following report.

3. RESEARCH DESIGN AND PROCEDURE

Overall Design

To test the foregoing five hypotheses, the research was conducted in two phases. Tests of Hypotheses 3 and 4 alone were conducted in Phase I. While this work proceeded, instruments needed to test Hypotheses 1, 2 and 5 were being constructed. All five hypotheses were then tested in Phase II.

The basic design was intended to employ eight treatment or Curriculum groups, defined by the type and number of Health Education Curriculum units a student had received:

Lung _and_ Heart _and_ Brain
Lung _and_ Heart
Lung _and_ Brain*
Heart _and_ Brain
Lung only
Heart only
Brain only
No units

While it was recognized that a pre-post design for a longitudinal evaluation of impact of SHCP would have been desirable, practicality precluded this possibility. Students who were enrolled as fifth graders in the Lung Curriculum would by the time of this research be in the ninth grade, an intervening period of four years. To capture a similar time lapse, beginning with fifth graders in 1973 would require a delay until 1977 for obtaining comparable follow-up data. A retrospective evaluation plan was therefore settled upon. Fortunately, existing practices in use of SHCP by the schools permitted

---

* The discontinuous Lung _and_ Brain, given in grades 5 and 7, was not represented in the final design.

[illegible] randomly assigned?

a design using a control group of students with similar characteristics enrolled in the same schools at the same times but not enrolled in the Curriculum.

Selection of school districts

As described in a report "Feasibility of Locating Subjects Who Have Had Units of the Elementary School Health Curriculum Project and of Administering the Teenage Self-Testing Kit to Them and Comparing Their Scores with National Norms" (Colmen, June 1973), a number of criteria were established for including districts in the research. These were:

- that the Curriculum had been operational in the district since 1969.
- that districts would be able to construct lists of students enrolled in each of the three units by year.
- that students still within the district could be located in the junior high or the secondary schools to which they had in most cases moved.
- that cooperation from school officials and parental consent, where necessary, could be obtained. (Appendix H)
- that a control group, matched as closely as possible with Curriculum enrollees was available.

Preliminary inquiries revealed that of seven districts in which the Curriculum was first implemented, two of the districts would not be able to participate because of extremely high student mobility out of their areas, which would seriously limit the number of Curriculum students available for follow-up.

To assure quality in sampling and administration of instruments, the remaining five districts, Bethlehem, Cajon Valley*, Kanawha, Los Altos, and West Genesee sent representatives to a one-day training session with staff of Education and Public Affairs and the Community Control Development Division in Washington, D.C. Among topics discussed were: methods of identifying potential students; sampling of students; assigning code numbers to each student; questionnaire administration methods; and local problems or situations requiring special handling.

One district, Los Altos, indicated its inability to furnish a control group from within its locale since almost all students had either been involved in the program or had recently moved into the district. Also, the Cajon Valley, Bethlehem and Kanawha County School Districts reported that almost no students had had all three units, primarily because junior high schools giving the nervous system unit in seventh grade did not receive students from schools where the fifth and sixth grade units had been taught.

---

* The Cajon Valley schools participated in the pre-tests. Unfortunately, due to events beyond their control, they were unable to continue their participation throughout the study.

Selection of student samples

The sample for Phase I consisted of current ninth graders who were in the fifth grade in 1969 when the first unit (Lung) was given; in the sixth grade in 1970 when the first Heart unit was initiated; and in the seventh grade in 1971, when the first Brain unit was introduced. The sample for Phase II included ninth, tenth, and eleventh graders; the Phase II tenth graders were the same students as the Phase I ninth graders and all eleventh graders were controls.

Students enrolled in any Curriculum combination were identified as "Experimental" students. Preliminary tallies of available students obtained from the participating districts disclosed that not every district had sufficient Curriculum enrollment in each of the experimental cells to sample in each one.* In the end, districts necessarily drew samples of students in only those categories with enrollment sufficient for research purposes. In every case, however an attempt was made to sample equal numbers of boys and girls.

why? Results the combined [illegible] so equal [illegible] -Use proportion sampling might lead to bias results in favor of the lesser number sex in each grade level. combined groups.

Students were defined as "Controls" if they had never been enrolled in any of the three units. Initially, differences were projected between three types of possible Control subjects, based on the degree of exposure to or "contamination" by the Experimental group. In the first instance would be those students who had not themselves had the Curriculum units but had interacted with classmates at their own grade who were enrolled, or were taught in classrooms where Curriculum materials were conspicuously displayed. These students would, therefore, be designated as "High Exposure Controls", while those in schools where units were being given at grade levels other than their own would be designated as "Low Exposure Controls". Students from schools where Curriculum units were never present during their attendance, on the other hand, were designated as "No Exposure Controls". In actual fact, no district located a sufficiently large group of "Low Exposure" Controls. As for High Exposure Controls, only 21 were located, in the West Genesee Central schools. Where local controls are cited, therefore, the overwhelming majority are "No Exposure" Controls.

---

* Discrepancies between preliminary and final verified tallies were large, so that sampling designs had to be revised upon receipt of final tallies.

[illegible] of [illegible]

The final counts for Phases I and II are as follows:

Phase I

Experimentals	N
Lung-Heart-Brain	238
Lung-Heart	76
Heart-Brain	116
Lung	60
Heart	147
Brain	206
TOTAL	843*
Controls	
High Exposure	21
No Exposure	187
TOTAL	208*

These Ctls, are mainly 11th graders, while experimentals are younger?

Stacks the cards against positive differences, esp. considering the

See tables F-2, F-3, F-5.

---

* In experimental analyses the numbers were reduced to 815 Experimentals and 203 Controls due to missing data.

Phase II*

	Knowledge N	Health Behavior N	Attitude Factors N	Smoking Behavior N	School Related Behavior N
Experimentals					
Lung-Heart-Brain	181	391	0	165	383
Lung-Heart	176	204	171	167	194
Heart-Brain	146	239	0	131	234
Lung	130	128	130	121	125
Heart	112	122	118	114	118
Brain	180	236	0	175	234
Total	925	1320	419	873	1288
Controls	398	393	276	383	379

In addition to local Controls, a National sample of 800 ninth, 838 tenth and 845 eleventh graders was used as a quasi-control group in both phases. These comprised students, never exposed to the Curriculum, surveyed in 1973 to developing norms for subscales of the Teenage Self-Test.

Data collection instruments

Health Knowledge Test. Because the Curriculum content is specific, a new Health Knowledge Test was constructed. Psychometric methods employed are described in Appendix A. Appendix B is a copy of the test itself, used to collect data to test Hypothesis I.

Health Behavior Inventory. Since existing health behavior measures were found not to measure behaviors related to the objectives stated by the Clearinghouse a new inventory was needed. Various formats of appropriate questions were designed and pre-tested with boys and girls in the ninth grade of two parochial schools in Silver Spring, Maryland. The responses of the students both to the questions and the formats were evaluated, particularly in terms of which was most likely to produce truthful, as opposed to "expected" responses. Revisions were made and the instrument used in the data collection to test Hypothesis 2. A copy of the Inventory appears as Appendix C.

---

* The Ns given here are the maximum available for analyses. Throughout the analyses presented later the Ns will vary from those given here due to differing amounts of missing data for each district, curriculum group and student sample.

[illegible] test [illegible] coefficients [illegible]

- Teenage Self-Test: Smoking. To measure attitudes toward cigarette smoking, the Teenage Self-Test was employed.* The Teenage Self-Test is a self-administered and scored instrument measuring eight clusters of items related to the practice of cigarette smoking, developed from hundreds of interviews with teenagers and administered to a national probability sample of some 5,000 students in grades seven through twelve. Scores for eight clusters are derived from an experimental 83-item version as follows:

expt?, [illegible]

    - Health Concern, Costs
    - Non-smokers' rights
    - "Positive" Smoker Attributes
    - Direct Effects: "Benefits"
    - Negative Smoker Attributes
    - Parental Control, Authority
    - Destiny Control, Independence
    - Rationalization

---

*Developed by Education and Public Affairs, Washington, D.C. under contract with the National Clearinghouse for Smoking and Health, then under the Health Services and Mental Health Administration, HEW. (Appendix D)

Phase II*

	Knowledge N	Health Behavior N	Attitude Factors N	Smoking Behavior N	School Related Behavior N
Experimentals					
Lung-Heart-Brain	181	391	0	165	383
Lung-Heart	176	204	171	167	194
Heart-Brain	146	239	0	131	234
Lung	130	128	130	121	125
Heart	112	122	118	114	118
Brain	180	236	0	175	234
Total	925	1320	419	873	1288
Controls	398	393	276	383	379

In addition to local Controls, a National sample of 800 ninth, 838 tenth and 845 eleventh graders was used as a quasi-control group in both phases. These comprised students, never exposed to the Curriculum, surveyed in 1973 to developing norms for subscales of the Teenage Self-Test.

Data collection instruments

Health Knowledge Test. Because the Curriculum content is specific, a new Health Knowledge Test was constructed. Psychometric methods employed are described in Appendix A. Appendix B is a copy of the test itself, used to collect data to test Hypothesis I.

Health Behavior Inventory. Since existing health behavior measures were found not to measure behaviors related to the

---

* The Ns given here are the maximum available for analyses. Throughout the analyses presented later the Ns will vary from those given here due to differing amounts of missing data for each district, curriculum group and student sample.

A listing of the items in the eight scales of the experimental version of the Teenage Self-Test, used to test Hypothesis 3, appears as Appendix E.

- Smoking Behavior Classification. The experimental version of the Teenage Self-Test was supplemented with a number of demographic and behavioral items. Included among these were questions 77 and 78 dealing with past and present practices with respect to cigarettes from which a "Smoking Behavior" classification was derived. The smoking behavior classification was constructed as follows:

  Non-smoker: has smoked less than 100 cigarettes in the past and does not smoke now. (answered 1 or 2 to question 77; 2 to question 78)

  Smoker: has smoked in past and does smoke now. (answered 2 or 3 to question 77; 1 to question 78)

- School-Related Behavior Inventory. To measure elements of student behavior in the learning situation, as related to the Curriculum, a behavior inventory drawn around specific outcomes was required. No appropriate instrument was found in the literature. However, an extensive list of "critical incident" materials was available from the Clearinghouse. These incidents were behaviors reported by teachers who had used the Curriculum for a year, based on observation of their students. Asked to write descriptions immediately to Education and Public Affairs for analysis, where they were edited, coded as necessary for key-punching, punched and then transferred to tape for statistical analysis against pre-designated instructions.

4. RESULTS

The five hypotheses in Section 2 were tested against selected dependent (criterion) variables:

- Health knowledge, as measured by a total score and three subtest scores of the Health Knowledge Test (See Appendix B). **
- Health behavior, as measured by the sum of item scores of the Health Behavior Inventory (See Appendix C). **
- Eight scale scores from the Teenage Self-Test: Smoking (See Appendix D).
- Smoking behavior from the Teenage Self-Test, items 77 and 78.
- School-related behavior, as measured by the sum of item scores on the School-Related Behavior Inventory (See Appendix C). **

Preliminary Analyses

Two preliminary analyses, of School District effect and of Grade effect,* were conducted in order to determine their use in testing the major experimental hypotheses.

---

*Appendix F, Tables 1 and 2, summarize all District and Grade analyses.

**Reliability coefficients are reported in Appendix I(Eye)

- District Analysis compared groups uncontaminated by differences in grade and in number of curriculum units taken to yield an estimate of the "clean" effects of district on the dependent variables.

In Phase I, t-tests revealed significant School District differences for only one out of ten dependent variables -- Scale 3 of the Teenage Smoking Kit where those enrolled in the Heart unit in Kanawha (N=92) scored significantly lower ($p < .01$) than those in the Heart unit in West Genesee (N=52).

Of the dependent variables measured in Phase II, only the four Knowledge Test Scores revealed significant differences between eleventh grade controls, with Kanawha scoring lower than Bethlehem ($p < .01$).*

By and large, then, School District effect was minimal. Nevertheless, where appropriate, these differences were taken into account in testing the major hypotheses either by analyzing districts separately or by using 2-way analysis of variance (Curriculum groups by District).

- Grade Analysis compared groups uncontaminated by differences between districts and in the number of curriculum units taken to yield an estimate of the "clean" effects of grade on the dependent variables.

---

*The District differences for the eight attitude scales were not re-tested in Phase II.

Of the 17 dependent variables tested in Phase II, three Attitude Scales and four Knowledge Test scores revealed significant Grade differences. For Scales #3 and #5, ninth graders scored significantly higher ($p < .05$) than eleventh graders. Eleventh graders scored significantly higher ($p < .05$) than ninth graders on Scale #7. Ninth graders expressed more positive reasons for smoking (Scale 3) and at the same time stronger negative attitudes about those who do smoke (Scale 5). As expected, eleventh graders reported feeling more independent and in control of their lives than ninth graders (Scale 7).

Tenth and eleventh graders, furthermore, scored significantly higher ($p < .01$) than ninth graders on all Knowledge Tests. This finding may derive from the fact that health knowledge may be covered in other school courses which may tend to reinforce early learning.

Because significant grade differences were found, grade was taken into account in testing the major hypotheses by analyzing grades separately or by using grade as a covariate.

Major Analyses

For each major hypothesis, analyses were conducted to take account of the effects of Level of Dosage and Treatment.

Level of Dosage Analysis tests the hypothesis that:

> students enrolled in successively more Curriculum units will be statistically different from those enrolled in fewer units. The assumption is made that addition of units has both a broadening effect in coverage related to cigarette smoking, such as Heart *and* Lung Units, and a reinforcing effect due to a common core repeated in all units.

Treatment Analysis tests the hypothesis that:

> the means of all students in one or more Curriculum units will be statistically different on the dependent variables from those who are not enrolled in any units.

Among the statistical approaches used were analysis of variance*, chi-square, and t-tests to compare Curriculum exposure groups, including Controls**; and correlation analysis when indicated to obtain the relationship between dependent variables and indices of increasing exposure to the Curriculum.

Hypothesis I -- Relationship of enrollment in Curriculum to later possession of health knowledge

Sample:

	Kanawha		Bethlehem	
EXPERIMENTALS	Grade 9	Grade 10	Grade 9	Grade 10
Lung-Heart-Brain	---	---	181	---
Lung-Heart	118	58	---	---
Heart-Brain	---	---	96	50
Lung	77	53	---	---
Heart	41	71	---	---
Brain	---	---	28	152
TOTAL	236	182	305	202
CONTROLS	218	58	43	79

---

* Where the F-value was significant at less than the .05 level, appropriate post-tests (Scheffe or Tukey) were computed.

** Throughout the analyses, Curriculum units not cited had not occurred, the numbers were too small to sample, or the final size was too small to use. West Genesee has been omitted from most analyses because of the paucity of their Control students.

Dependent Variable: One total score* and three subscores from the Health Knowledge Test.

Results: Separate analyses of variance and t-tests for each grade and district, followed by post-tests when appropriate, produced level of dosage and treatment results for Kanawha and Bethlehem. Table I summarizes significant differences between Curriculum and Control groups.

Table I

Significant Differences between Curriculum Exposure Groups, Including Controls

Curriculum Units Sampled		Health Knowledge Test Scores			
Kanawha	Grade	Total	Lung	Heart	Brain
Lung/Heart	9	.01	.01	.01	NS
	10	.01	.01	.01	NS
Lung only	9	.01	NS	NS	.01
	10	.01	.01	NS	.01
Heart only	9	NS	NS	NS	NS
	10	NS	NS	NS	NS
Bethlehem					
Lung/Heart/Brain	9	NS	NS	.01	NS
Heart/Brain	9	NS	NS	NS	NS
	10	NS	NS	.01	NS
Brain only	9	NS	NS	NS	NS
	10	NS	NS	NS	NS

NOTE: Values in Table I are F-Ratio Levels of Significance; NS means not significant at $p < .05$;
(Appendix F, Table 3, presents the actual Means and F-levels)

---

* To obtain total score on the Health Knowledge Test, each subtest score was standardized on the total group according to the formula: $z=(x-m)/s$ where m=mean of those having at least that unit and s=standard deviation of those having at least that unit. Then the three standardized subscores were summed to obtain the total score.

- Total Health Knowledge Score

On the Health Knowledge Test total score, ninth and tenth grade Kanawha students enrolled in Lung/Heart and Lung only units scored significantly higher than Controls ($p < .01$). Kanawha students enrolled in Heart units scored higher than Controls but not significantly higher. In Bethlehem, ninth grade Lung/Heart/Brain students scored significantly higher than Brain students ($p < .01$) but not significantly higher than Controls. Students who had taken the Lung unit singly or in any combination seem to obtain higher scores than Controls on the Health Knowledge Test total score.

- Health Knowledge, Lung Score

On the Lung Test, Kanawha ninth and tenth grade Lung/Heart students ($p < .01$) and tenth grade Lung students ($p < .01$) scored significantly higher than Controls. In Bethlehem, ninth grade Lung/Heart/Brain students scored significantly higher than Heart/Brain and Brain students. In both grades of the Kanawha school district, the direction of mean scores for Lung Knowledge increased from lowest for Controls on up to groups with Heart only, to Lung only, to Lung/Heart with the highest. Those who had taken the Lung unit or a combination including the Lung unit tended to score higher on the Lung test, as expected.

- Health Knowledge, Heart Score

Heart Test scores for students enrolled in multiple units including Heart as one component, i.e., Lung/Heart, Lung/Heart/Brain, and Heart/Brain, were significantly higher ($p < .01$) than for Control group students in both grades of both districts, with the exception of the Heart/Brain group in Bethlehem's ninth grade. Students with only single Heart units failed to score significantly higher than Controls, but the mean differences were nevertheless in the expected direction.

- Health Knowledge, Brain Score

  Although Kanawha had no students enrolled in single or multiple Brain units, in both grades students with the Lung unit only scored significantly higher ($p < .01$) on the Brain Test than did Controls. In Bethlehem, although a significant F ($p < .01$) was found in ninth grade, post-tests failed to account for the internal location of those differences.

Correlation analysis supports the foregoing evidence in showing a significant relationship between Health Knowledge Test scores and two indices of increasing exposure to the Curriculum: Curriculum Exposure I, with four groups (Controls, single units, double units and triple units - values of 0,1,2 and 3) and Curriculum Exposure 2 with three groups (single units, double units, and triple units; excluding Controls - values of 1,2, and 3). Table 2* shows that all correlations except one are significant at $p < .05$ or better.

---

*Appendix F, Table 4 presents specific correlation coefficients.

Table 2

Significance Levels for Correlations between Health Knowledge Test Scores and Curriculum Exposure Indices.

	Curriculum Exposure 1		Curriculum Exposure 2	
	Grade 9	Grade 10	Grade 9	Grade 10
Total Score	.01	.01	.01	.05
Lung Score	.01	.01	.01	.05
Heart Score	.01	.01	.01	.01
Brain Score	.01	.05	.01	NS

NOTE: .01 means p .01 level of significance
.05 means $p < .05$ level of significance
NS means not significant at $p < .05$.

Students who had had three units tended to score higher than those who had had two units; two units higher than one; and one unit higher than Controls. Could get the correlations if only 2 units were [illegible] than 0 [illegible] without having 1>0 or 3>2.

When all treatment groups were combined, thereby ignoring the number of units in which students were enrolled, differences between Experimentals and Controls washed out. Exceptions occurred on the Lung and Heart Tests where Kanawha ninth grade Experimentals scored significantly higher than Controls ($p < .01$) and on the Heart Test where Bethlehem ninth grade Experimentals scored significantly higher than Controls (p .05). All test means were, however, in the expected direction, i.e., Experimentals consistently scoring higher than Controls (See Appendix F, Table 5 for means).

Conclusions: In general, Knowledge Test scores relate appropriately to the kind and number of units taken. Students who have had the Lung unit alone or in combination with other units tend to score higher on both the total test and the Lung Test. On the Heart Test, students with combination units, but not students with the Heart unit only, scored significantly higher than Controls. This suggests the possibility, with Lung or Heart units, of a reinforcement effect of combination units. Results did not present a clear picture of the relationship between having had the Brain unit and scores on the Brain Test.

On the whole, evidence supports rejection of the null hypothesis that enrollment in Curriculum units is not related to possession of Health Knowledge. Rather, it appears that enrollment in Curriculum units, particularly Lung or combination Lung units, relates to higher scores on total Health Knowledge and on the specific Lung Knowledge Test; that enrollment in combination Heart units relates to higher Heart Test scores. There is also evidence to suggest that having taken more units or combination units, particularly those including Lung or Heart, has an enhancing effect on all Health Knowledge scores.

Hypothesis 2 -- Relationship of enrollment in Curriculum to later health-related behavior

Sample: Kanawha, Bethlehem and West Genesee - 9th and 10th grades

Experimentals	N
Lung-Heart-Brain	391
Lung-Heart	204
Heart-Brain	239
Lung	128
Heart	122
Brain	236
TOTAL	1,320
Controls	393

Dependent Variable: Total score on Health-Related Behavior Inventory (see Appendix C).

Results: In preliminary analyses, Health-Related Behavior scores for the various Curriculum exposure groups were not found to be affected either by grade or district. Therefore, all grades and districts were combined for analysis.

Using analysis of variance, the eight Curriculum exposure groups were compared, producing a significant F ($p < .05$). Post-tests, however, failed to reveal the location of these significant differences among groups. Means and Ns for the groups are presented below (Table 3).

Table 3

Health-Related Behavior Test Means for Curriculum Exposure Groups

Curriculum	N	Means
Lung/Heart/Brain	391	54.66
Lung/Heart	204	54.04
Heart/Brain	239	53.14
Lung	128	54.46
Heart	122	52.34
Brain	236	53.97
Controls	393	52.40

When Experimentals were compared with Controls, Kanawha and Bethlehem produced different results, as summarized in Table 4.

Table 4

Significant Differences between Experimental and Control Students on Health Behavior Inventory**

	Kanawha				Bethlehem			
	Grade 9		Grade 10		Grade 9		Grade 10	
	N	Means	N	Means	N	Means	N	Means
Experimentals	237	52.39	183	55.38*	300	54.92	201	53.94
Controls	215	51.56	57	51.70	41	52.93	80	54.90

* = $p < .05$

Only Kanawha tenth grade Experimentals scored significantly higher than Controls. However, Kanawha and Bethlehem ninth graders had means in the expected direction, i.e., Experimentals scoring higher than Controls. Inexplicably, Bethlehem tenth grade means for Controls and Experimentals were in a direction opposite to that found for Kanawha ninth and tenth graders and for their own ninth graders. As will become evident in other analyses, data for Bethlehem tenth grade was often different, i.e., in the opposite direction, from Bethlehem ninth grade and also the data for other districts; yet no logical explanation has been advanced to explain that difference.

Correlation data revealed a significant relationship between the two curriculum exposure indices and Health Behavior Inventory scores for ninth graders. Tenth grade data failed to corroborate this, perhaps again because of the unusual character of the scores of Bethlehem tenth graders.

Conclusions: The findings necessary to reject the null hypothesis, that Health-Related Behavior and Curriculum Exposure are not related,

---

** West Genesee has been eliminated because of lack of controls.

are mixed. Correlation analysis supports a relationship between Curriculum exposure and Health Behavior scores for the ninth grade, for example, but not for the tenth. Significance tests, on the other hand, show no statistically significant differences between various exposure groups and Health Behavior scores, except for the Kanawha tenth grade; even so, the Health Behavior scores of curriculum exposure groups are in almost all instances in the expected direction, i.e., higher than those of the Control groups.

Hypothesis 3 -- Relationship of enrollment in Curriculum to later attitudes toward smoking

Sample:

	Phase I - Grade 9	Phase II - Grades 9 and 10	
	Bethlehem, Kanawha, Los Altos, and West Genesee	Kanawha	West Genesee
Experimentals			
Lung-Heart-Brain	238	---	221
Lung-Heart	76	171	27
Heart-Brain	116	---	104
Lung	60	130	---
Heart	147	118	5
Brain	206	---	57
TOTAL	843	419	414
Controls	203	276	---
	National Norm	National Norm	
Controls	760	1,638	

Dependent Variable: Eight scale scores from the Teenage Self-Test: Smoking (Appendix D).

Results: A series of analyses was conducted to compare Curriculum exposure groups on the eight Teenage Self-Test scale scores.

- Comparison of Experimental Curriculum groups with national norm Controls

In Phase I, an Automatic Interaction Detection analysis (Appendix G) led to the conclusion that there were no differences in four demographic variables between ninth graders in the National Norm and the Curriculum Study Control students. For this reason, it was concluded that the Experimental group could be compared with the National Norm group as a Control. When this was done, significant differences were found in favor of the Experimental group on Scales 1, 6, 7 and 8 ($p < .01$); and in favor of the "Control" or National group on Scale 3 ($p < .01$). Thus in Phase I, it appeared that exposure to the Curriculum did tend to affect positively a number of anti-smoking attitudes, when compared with a representative national group of ninth-graders.

Unless the 2 T-scores were standard scores they are not comparable because of change. See p.17

In Phase II, however, ninth grade data did not sustain this relationship of Curriculum exposure and attitudes, no differences being found between Experimentals and National Controls. Only Scale 4 favors the Experimental group in the tenth grade (the same subjects as Phase I ninth grade).

- Comparison of Experimental groups and their own Control groups

In Phase I, except for Scale 8 ($p < .05$), significant differences in Teenage Self-Test scale scores in the appropriate direction were not found. Because the bulk of the Control subjects (182 out of 203) were from Kanawha, it was hypothesized that they might not have been representative of the Experimental subjects drawn from all four districts. The Treatment Effect hypothesis was retested using Kanawha students only, therefore ruling out possible geographical differences. The findings, however, were essentially unchanged.

In Phase II, almost as in Phase I, significant differences were not found, either for the ninth or tenth graders.

- Comparisons of level of exposure among Curriculum Study Control students, those who had been enrolled in only one unit, those with two units, and those with all three units.

  In Phase I, Teenage Self-Test scale score differences in the appropriate direction between the various "level of dosage" groups were found in Scale 8, ($p < .05$). Again, because the Control group was so heavily drawn from Kanawha, the "level of dosage" hypothesis was tested for Kanawha alone. While there were no students in Kanawha with all three Curriculum units, a progression from Controls through a double unit was present, permitting this comparison to be made. The results for Kanawha paralled the results for the total group.

  In Phase II, using analysis of variance techniques, the Curriculum exposure groups were compared with respect to attitude scale scores. Again, no significant differences were found.

Conclusions: Overall, the data do not support the hypothesis that Curriculum exposure in earlier years is related to positive (favoring non-smoker) attitude scale scores tested two to five years later. It may be recalled that effect on attitude toward cigarette smoking was a hoped-for, but secondary objective to be accomplished by the Curriculum. In studying

the actual content of the experimental School Health Curriculum Project, one finds that specific content directly on the subject of cigarette smoking per se is quite limited. Certainly the impression is there for the student to draw about its ill effects, but not in a highly overt way. This being the case, it may be too much to expect that enrollment in the Curriculum should have a stronger impact on attitudes toward smoking behavior than on attitudes toward any of a number of other individual health behaviors, such as diet, rest, exercise and the like. Furthermore, growing evidence that attitude changes are not always necessary steps on the road to behavior change, may give support to reducing the premium given to attitude modification with respect to cigarette smoking among adolescents. This view may have even more credence when one sees the section which follows on the effects of the Curriculum on later cigarette smoking behavior.

Hypothesis 4 -- Relationship of enrollment in Curriculum to later smoking behavior

Sample:

	Phase I - Grade 9 Bethlehem, Kanawha Los Altos, and West Genesee	Phase II - Grades 9 and 10 Kanawha and Bethlehem
Experimentals		
Lung-Heart-Brain	238	165
Lung-Heart	76	167
Heart-Brain	116	131
Lung	60	121
Heart	147	114
Brain	206	175
TOTAL	843	873
Controls	208	383
	National Norm	National Norm
Controls	760	1,638

Dependent Variable: A smoking behavior classification based on items 77 and 78 of the Teenage Self-Test.

Results: Significance of differences between percentages of smokers and non-smokers in the various Experimental and Control groups were calculated. (Table 5)

Table 5

Percentages of Smokers and Non-Smokers for Various Experimental and Control Groups

Phase I	N	% Smokers			% Non-Smokers
Ninth grade					
Study Experimentals	815	25.4			74.6
Study Controls	203	26.1	*	**	73.9
National Controls	760	32.2			67.8
Kanawha Experimentals	221	22.6			77.4
Kanawha Controls	182	25.8	*	**	74.2
National Controls	760	32.2			67.8
Phase II					
Ninth grade					
Study Experimentals	507	27.6	*		72.4
Study Controls	251	33.9		*	66.1
National Controls	800	32.3			67.7
Kanawha Experimentals	231	27.3			72.7
Kanawha Controls	210	32.9			67.1
National Controls	800	32.3			67.7
Tenth grade					
Study Experimentals	366	32.0			68.0
Study Controls	132	31.8			68.2
National Controls	838	32.7			67.3
Kanawha Experimentals	171	31.0			69.0
Kanawha Controls	55	40.0			60.0
National Controls	838	32.7			67.3

* $p < .05$
** $p < .01$

NOTE: Brackets indicate significant differences.

In Phase I, significant differences in the proportion of cigarette smokers were not found between Curriculum Experimentals and study Controls. In Phase II, however, when all Experimentals and all study Controls were compared separately by Grade, fewer cigarette smokers ($p < .05$) were found among ninth grade Experimentals than among Controls. The same finding was not found in the tenth grade, however, again reflecting the possible different make-up of the Bethlehem tenth grade.

Percentages of smokers in Phase I and II ninth grade Study Controls may be seen to vary-- Phase I having a significantly lower percentage of smokers than Phase II. However, percentages of smokers in Study Experimental groups for the two phases were not statistically different. These differences would of course also contribute to the conflicting results, when comparing the Experimentals with Study Controls.

To counteract the inexplicable variation disclosed above, ninth grade Curriculum Study Experimentals for both Phases were compared with the National Control group, which of course was unchanged between Phases. In both Phases, results were consistent -- a lower percentage of smokers was found in the Experimental group than in the National Norm group (Phase I, $p < .01$; Phase II, $p < .05$).

Comparison of percentage of smokers in Kanawha alone paralleled the previous results in Phase I. In Phase II, although significant differences were not found, the results were consistently in the expected direction, i.e., a lower percentage of smokers in the Experimental than in the Control groups.

[illegible]

Conclusion: While not entirely conclusive, there is some support, particularly in the ninth grade, for rejection of the null hypothesis that Smoking Behavior and exposure to Curriculum are not related. From ninth grade data, it is seen that the Curriculum-enrolled Experimental groups contain fewer cigarette smokers than either Study or National controls. While similar differences are not found for the tenth grade, this may once again be due to the peculiar score reversals of Bethlehem's tenth grade data.

Hypothesis 5 -- Relationship of enrollment in Curriculum to later School-related behavior

Sample:

Grades 9 and 10
Kanawha and Bethlehem

Experimentals	
Lung-Heart-Brain	383
Lung-Heart	194
Heart-Brain	234
Lung	125
Heart	118
Brain	234
TOTAL	1,288
Controls	379

Dependent Variable: Score on the School-Related Behavior Inventory.

Results: Preliminary analysis revealed that School-Related Behavior Inventory test scores were not affected by either grade or district.

In the principal data treatment, analysis of variance failed to reveal significant differences among the various Curriculum level of dosage groups. (Table 6)

Table 6

School-Related Behavior Test Scores for Various Curriculum Exposure Groups

Curriculum	N	Mean
Lung/Heart/Brain	383	76.87
Lung/Heart	194	76.79
Heart/Brain	234	79.80
Lung only	125	75.25
Heart only	118	77.70
Brain only	234	76.40
Controls	379	76.15

When differences in number of Curriculum units were ignored, comparing all Experimentals with all Controls, significant differences once again failed to emerge. As may be noted from Table 7, nevertheless, three of the four Experimental groups in the separate districts and separate grades scored higher, in the expected direction, though not statistically significantly, than Controls.

Table 7

Means and Significance of Differences for Experimental Compared with Control Students on the School-Related Behavior Inventory

	Kanawha				Bethlehem			
	9th Grade		10th Grade		9th Grade		10th Grade	
	N	Mean	N	Mean	N	Mean	N	Mean
Experimentals	225	78.35	179	74.02	293	76.46	203	75.83
Controls	204	76.92	55	73.35	42	78.38	78	74.92

Conclusion: Evidence is insufficient to reject the null hypothesis that there is no relationship exposure to Curriculum and school-related behavior.

Additional Analyses

Interrelations among dependent variables

The various dependent variables used as outcome indicators in the study were found themselves to be highly interrelated. (Table 8)

Table 8

Significant Product Moment Correlations ($p < .01$) Among Dependent Variables

	Health Behavior	Health Knowledge	Smoking Attitudes (8 Scales)	School Behavior	Smoking Behavior
Health Behavior		✓	(8)* ✓	✓	✓
Health Knowledge			(5) ✓	✓	✓
Smoking Attitudes (8 Scales)				(7) ✓	(8) ✓
School Behavior					✓
Smoking Behavior					

* Numbers in parentheses indicate number of scales with significant correlations.

The correlations between the dependent variables suggest a complex of knowledge, attitude and behaviors that characterize teenage non-smokers and differentiate them from teenage smokers. Teenage non-smokers tend to have higher Health Behavior scores, higher Health

Knowledge Test scores, attitudes more in keeping with non-smokers, and higher School Behavior scores than smokers.

Conclusion: Because of the high interrelationships among the foregoing variables, it would appear that smoking behavior among teenagers may lend itself to change by a variety of means of intervention, so that transmission of knowledge may be accompanied by or associated with changes in attitude and behavior. Since educational programs generally have utility in these areas, considerable support would appear for continuing such efforts as the School Health Curriculum Project as one possible way of reducing cigarette smoking among adolescents.

Relationship of Reported Parents' Smoking and Peers' Smoking to Teenagers' Smoking Behavior

Table 9 summarizes findings concerning the relationship between teenagers' smoking behavior and that of their parents and peers.

Table 9

Comparative Relationships of Reported Parents' Smoking and Peers' Smoking with Self Smoking and Other Variables *

	4 Best Friends Smoke	Parents Smoke
Smoking Behavior	.67	.16
Health Behavior	.30	.08
Health Knowledge	.25	.16
School Behavior	.36	.11

* Entries are product-moment correlations, all significant at $p < .01$.

Conclusion: While correlations between dependent variables and peer or parents' smoking behavior are both statistically significant, as may be seen from the consistently higher magnitude of the correlations obtained with peer behavior, youngsters are more likely to be influenced by whether or not their friends smoke than by whether or not their parents smoke.

5. LIMITATIONS AND CONCLUSIONS

Limitations

Before presenting a summary of conclusions reached, the reader should be aware of the limitations imposed on the evaluation research, essentially all arising from the pragmatic problems inherent in field research.

- Attrition in expected participation of all five of the original school districts led finally to elimination of two California school districts, and left an even more truncated group of samples from which to generalize about the Curriculum, i.e., one in West Virginia and two in upstate New York.
- Inordinate delay in Phase II in gaining CDC, HEW and OMB clearances for the measuring instruments led to approvals so late in the spring semester that some schools dropped out and others administered an abbreviated version of the Battery. While every effort was made to stabalize sampling, so that the reduced number was representative of the total, there is some evidence that the Phase II sample differs from Phase I. The frequent "on-again, off-again" expectations to proceed leveled upon the school systems over an eight month period necessarily led to resentment that diminished to an unknown degree the extent of their final involvement. Its effect on the sample of Behtlehem tenth graders which seemed to be uniquely different from other schools and even from its own ninth graders, is not entirely to be dismissed.
- The evaluation study designed for reasons given earlier, was not a true longitudinal design. Under the desire for evaluation results within a short time frame, no baseline measure could be obtained. It is not possible to say, therefore, the degree to which Experimental and Control groups changed comparatively over time.

In addition to recognizing the foregoing practical difficulties which affected the research, the reader is once again cautioned to remember that the results reported represent impact on students only, and do not speak to possible benefits, suggested in less systematic observations on teacher performance, school administrator policy making, parent behavior and community agencies. Thus this report addresses only one portion of the program, the results of which should not be generalized to its effects on the target groups.

Furthermore, children grow up under many different influences, in which family, friends, peers, media, church and schools play various parts in the child's development. Even within the school, children are exposed to numerous other curricula and teaching styles. The extent to which enrollment in SHCP alone can be expected to produce the kinds of student impact desired must be realistic. Two to five years later, the effect of SHCP may be present, but so muted by the wealth of other experiences to which the child has been exposed, that a statistically significant finding of durable impact may be too much to expect.

Conclusions

Hypothesis I: Health Knowledge test scores obtained two to five years later do relate to the kind and number of Curriculum units taken - the greater the Curriculum exposure, the higher the score on the Health Knowledge Test. Later knowledge, by and large, also is specifically related to the Curriculum unit or units in which the student was originally enrolled.

Hypothesis 2: In assessing the effect of enrollment in the Curriculum on reported health behavior two to five years later, a significant relationship was found between Curriculum exposure and Health Behavior Inventory scores for the ninth grade, but not for the tenth. In spite of the fact that significance tests showed few statistically significant differences between Experimental and Control groups, the differences most often were in the expected direction, i.e., Experimentals scoring higher than Controls. The consistency of direction suggests that another study, less affected by field operational problems and their possible impact on sampling, might support a finding of concordance between curriculum enrollment and health behavior.

Hypothesis 3: Attitudes as measured by the eight scales of the Teenage Self-Test failed to differ on the basis of whether students were or were not enrolled two to five years earlier in the Curriculum.

Hypothesis 4: In assessing the effect of enrollment in the Curriculum on reported smoking behavior two to five years later, smoking behavior was found to be significantly related to exposure to the Curriculum for ninth graders, with fewer cigarette smokers as expected in the Experimental than in the Control groups, but not for tenth graders. Phase II, nonetheless, while producing results not achieving statistical significance, does show consistency in the direction of relationships, with a lower proportion of cigarette smokers in Experimental than in Control groups. Once again, it is possible that another study, less distrubed by field operating difficulties and their impact on sampling, might produce results that meet statistical as well as rational tests of significance.

Hypothesis 5: School-related behavior as measured by self reports on the School-Related Behavior Inventory two to five years later failed to vary on the basis of whether a student had or had not been enrolled earlier in the Curriculum. It may have been that the elements measured in the School-Related Behavior Inventory were simply not sufficiently sensitive to the Curriculum. In more subsequent research, it might be useful to obtain such objective measures as school attendance or elevation of reading levels on a standardized reading test as measures of school impact. At least one school district reports obtaining promising findings in upgrading of student reading levels accompanying enrollment in the Curriculum.

Interrelationships of the dependent variables suggest that, by changing knowledge, changes in attitudes, health behavior and smoking behavior may also be affected; or that by changing any one or two, the remaining ones are likely to change as well, If this is so, intervention efforts directed toward inducing positive behavior to protect one's body systems should benefit from the kinds of education efforts represented by the School Health Curriculum Project. To the extent the Curriculum may be fashioned more directly to impact on behavior and attitude formation, its present benefits may be expected to be even further enhanced.

In the view of the research team, given the operating limitations imposed on the study and a realistic set of expectations of impact, the findings for SHCP are encouraging. They would speak for continuation of the effort, with time taken for an in-depth internal review, searching for ways in which a foundation for the types of specific attitude and behavior change could best be laid by modification or supplementation of content or methodology.

APPENDIX A

Development of the Health Knowledge Test

Development of the Health Knowledge Test

Writing the Pretest

As a first step in devising a test of health knowledge, much of the literature appropriate to the area was searched. This included:

- tests written by editors of biology textbooks for adolescents
- item pools constructed by research groups for use with various adolescent age groups
- tests designed by researchers for use in related studies (including a knowledge of cigarette smoking.)
- tests designed specifically to evaluate ESHEC, either at the local school level or in broader-scope studies.

Secondly, a classification of the goals and broad subject areas intended to be covered by the curriculum was established. These comprised two levels:

- a broad classification common to all three units, covering structure of various systems, function, causes of disease, and prevention of disease.
- content specific to each unit: for example, cigarette smoking, pollution, etc., in the respiratory unit; nutrition, etc., in the circulatory unit; drugs, etc., in the nervous system.

With this background in hand, items were drafted. Using the classifications listed above, items were written for each of the three areas -- lung, heart and brain. Three general types of items were written:

- four-choice multiple choice items
- multiple-choice items referring to diagrams of, respectively, the respiratory apparatus, the heart, and nerve cells
- matching items

On completion, the items were submitted for review to two physicians to insure the accuracy of content, and to people familiar with the curriculum to assure relevance. Item stems or responses were re-written where necessary, and wording was revised in certain cases to improve clarity and reduce ambiguity.

These efforts produced three separate tests -- a lung test of 48 items, a heart test of 46 items, and a brain test of 53 items. In addition one systems matching set, common to all three curriculum units, was constructed with 10 items.

Administration of the Pretest

It was decided that the three tests should be pretested on an "experimental" and a "control" group -- the experimental group composed of those students who had the units in the past, and the control group of those students who had not had the units. The control group would not be used to determine discrimination indices for the items, but simply to determine the extent to which the information embodied in the test was available in the general milieu of adolescents.

The pretest students were chosen from ninth-graders in two school districts, El Cajon and Los Altos, both in California. These districts were chosen because the other three of the original five districts (Kanawha, Bethlehem and West Genesee) would take part in final data collection in Phase II, and no students could be spared for pretest. It was felt that the range of abilities present in Los Altos and El Cajon would fairly represent the available range in the three primary test districts where the final test would be used.

Development of the Health Knowledge Test

Writing the Pretest

As a first step in devising a test of health knowledge, much of the literature appropriate to the area was searched. This included:

- tests written by editors of biology textbooks for adolescents
- item pools constructed by research groups for use with various adolescent age groups
- tests designed by researchers for use in related studies (including a knowledge of cigarette smoking.)
- tests designed specifically to evaluate ESHEC, either at the local school level or in broader-scope studies.

Secondly, a classification of the goals and broad subject areas intended to be covered by the curriculum was established. These comprised two levels:

- a broad classification common to all three units, covering structure of various systems, function, causes of disease, and prevention of disease.
- content specific to each unit: for example, cigarette smoking, pollution, etc., in the respiratory unit; nutrition, etc., in the circulatory unit; drugs, etc., in the nervous system.

With this background in hand, items were drafted. Using the classifications listed above, items were written for each of the three areas -- lung, heart and brain. Three general types of items were written:

- four-choice multiple choice items
- multiple-choice items referring to diagrams of, respectively, the respiratory apparatus, the heart, and nerve cells
- matching items

Ideally, each of the three texts would be administered to students who had had only that unit. However, sufficient numbers of such students were not available to permit that plan to be employed. In Los Altos all students had all three units; moreover, no controls were available. In El Cajon, while there was a sizeable group who had been enrolled in only the brain unit, the rest of the experimentals had been enrolled in both lung and heart units. Therefore, with the exception of the brain test in El Cajon, each test was given to students who had had the appropriate unit plus one or two other units.

Each student took only one of the three tests. In most cases students finished within 30 minutes.

The tests were administered in small group sessions by local personnel under guidelines established by Education and Public Affairs. All responses were confidential, the test papers being identified only by district, by the number of the test (1, 2 or 3 -- test names were not used), and by whether the respondent was an experimental or control subject.

Subjects were told that their responses would be confidential, that their results would be used to determine which items would be used in a later experiment, and that guessing was allowed. Very few items were found to be omitted.

Item Analysis

The basic purpose of the following analyses was to select items for the final test (or alternatively, to eliminate non-functioning items.)

Distributions of responses to the three tests were analyzed separately by test, by district, and by experimental or control group. (See Table A-1)* From inspection, certain findings emerge:

- The tests were all somewhat difficult, the lung test being the easiest and the brain the hardest.
- The experimental groups in all cases scored better than the control groups.
- There were essentially no differences between the experimental groups from the two districts.

Due to the last finding the experimental groups only from both districts were combined to determine discrimination indices and difficulty levels for each item. Each test was analyzed separately. The criterion in these analyses was an internal one, i.e., the total score on each test. The criterion group was divided into quartiles and the discrimination index plotted against this four-way breakdown. Each item was examined with respect to difficulty level, significance of discrimination index, and functioning of each distracter.

Ideal item difficulties of selected items should cluster around that point which discriminates maximally between experimental and control groups. In practice, sufficient items are seldom available at this point, and this was true in the current study. However, a satisfactory spread of item difficulties was obtained.

Items were chosen with difficulty levels between .30 and .80, where indices of discrimination were significant beyond $p < .05$, and distracters which were not functioning were changed. This was done sparingly, however, as the effect of changing a distracter may be to change the other parameters to some unknown degree.

---

* The possible range, or total score on each test reflects the fact that the 10-item systems-matching question was added to each test.

By this process, a total of 90 items was selected from the original 157, to be used in the final test. In terms of the classifications derived for item writing the final selected items were distributed as follows:

Lung Test

Structure	7
Function	7
Disease	7
External	2
Diagram	5

Heart Test

Structure	5
Function	4
Disease	7
Nutrition	1
Diagram	5
Matching	7

Brain Test

Structure	4
Function	6
Disease	5
Drug	5
Diagram	4

Systems matching	10

Within each of the three tests the items were randomized according to classification and to difficulty level. The three tests were then arranged to follow each other (without titles or breaks) in the order of lung, heart, brain, and systems matching.

Table A-1

Test Score Distributions
(Experimental Health Knowledge)

Test 1 -- Lung

	N	Mean	SD	Possible Range	Range
All Experimentals	102	31.20	8.70	0-58	7-49
Los Altos Experimentals	71	30.94	9.38	0-58	7-49
Cajon Experimentals	31	31.77	6.99	0-58	18-45
Cajon Controls	18	23.50	6.33	0-58	16-41

Test 2 -- Heart

	N	Mean	SD	Possible Range	Range
All Experimentals	96	25.42	8.95	0-56	9-47
Los Altos Experimentals	71	26.51	9.14	0-56	10-47
Cajon Experimentals	25	22.32	7.76	0-56	9-36
Cajon Controls	30	17.27	5.94	0-56	6-29

Test 3 -- Brain

	N	Mean	SD	Possible Range	Range
All Experimentals	133	24.68	9.17	0-63	7-46
Los Altos Experimentals	49	24.14	9.33	0-63	7-46
Cajon Experimentals	84	25.00	9.11	0-63	9-44
Cajon Controls	86	22.26	7.32	0-63	11-37

APPENDIX B

Knowledge Test

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Public Health Service
Center for Disease Control
Bureau of Health Education
lanta, Georgia 30333

OMB NO. 68S75038
APPROVAL EXPIRES June 1976

Place code No. here.

Knowledge Test

Please read all choices for a question before answering. Then circle the number beside the answer which best answers the question. Circle only one answer per question. If you don't know the answer, make the best guess at it. Work rapidly, but as carefully as you can.

1. Air exhaled and forced through which organ makes the sound of the human voice?
    1. pharynx
    2. larynx
    3. bronchial tube
    4. trachea

2. The diaphragm separates the:
    1. chest cavity from the abdominal cavity
    2. heart from the lungs
    3. trachea from the esophagus
    4. rib cage from the chest cavity

3. The most important way in which cancer cells differ from normal cells is that they:
    1. require different nutrients
    2. generate less heat in metabolism
    3. divide more rapidly
    4. carry fewer chromosomes

4. The rate of breathing is controlled by the:
    1. heart
    2. metabolism
    3. brain
    4. muscles

5. The pharynx is the:
    1. throat cavity
    2. voice box
    3. nasal cavity
    4. sinus cavity

6. A colorless, odorless and poisonous gas that comes out of automobile exhausts is called:
    1. carbon dioxide
    2. sulfur dioxide
    3. carbon monoxide
    4. hydrogen sulfide

Please continue on to the next page

7. When someone disturbs the balance of blood gases by breathing too fast, it is called:
    1. anoxia
    2. asphyxia
    3. hyperesthesia
    4. hyperventilation

8. The major part of the breathing motion is started by the:
    1. heart
    2. diaphragm
    3. rib cage
    4. lungs

9. From the pharynx the air breathed in goes to the:
    1. villi
    2. bronchi
    3. alveoli
    4. trachea

10. The most prevalent cause of death in the U.S. is:
    1. heart disease
    2. cancer
    3. accidents
    4. poisoning

11. Oxygen diffuses into the blood stream through the walls of the:
    1. trachea
    2. bronchi
    3. bronchioles
    4. alveoli

12. Alveoli are:
    1. finger-like projections in the small intestine
    2. tiny living hairs in the air passages
    3. air sacs in the lungs
    4. granules within the nuclei of blood cells

13. The function of the alveoli is to:
    1. allow blood to give up carbon dioxide and take on oxygen
    2. sweep dust and other unwanted materials up and out of the air passages
    3. absorb digested food into the blood stream
    4. keep food from going down the windpipe

14. An unmistakable symptom of inflammation of the pleural cavity is:
    1. sore throat
    2. painful breathing
    3. dry cough
    4. nasal congestion

Please continue on to the next page

15. Air is composed mainly of:
    1. nitrogen
    2. carbon dioxide
    3. oxygen
    4. carbon monoxide

16. Capillaries are blood vessels in which:
    1. blood flows with the greatest pressure
    2. blood flows only toward the heart
    3. blood flows only away from the heart
    4. the exchange of gases takes place in tissues

17. The principal symptom of emphysema is:
    1. shortness of breath
    2. painful breathing
    3. coughing up blood-tinged sputum
    4. nasal congestion

18. The function of cilia is to:
    1. keep food from going down the windpipe
    2. sweep dust and other unwanted materials from the air passages
    3. aid in the absorption of food
    4. allow for the exchange of oxygen and carbon dioxide between air and the blood

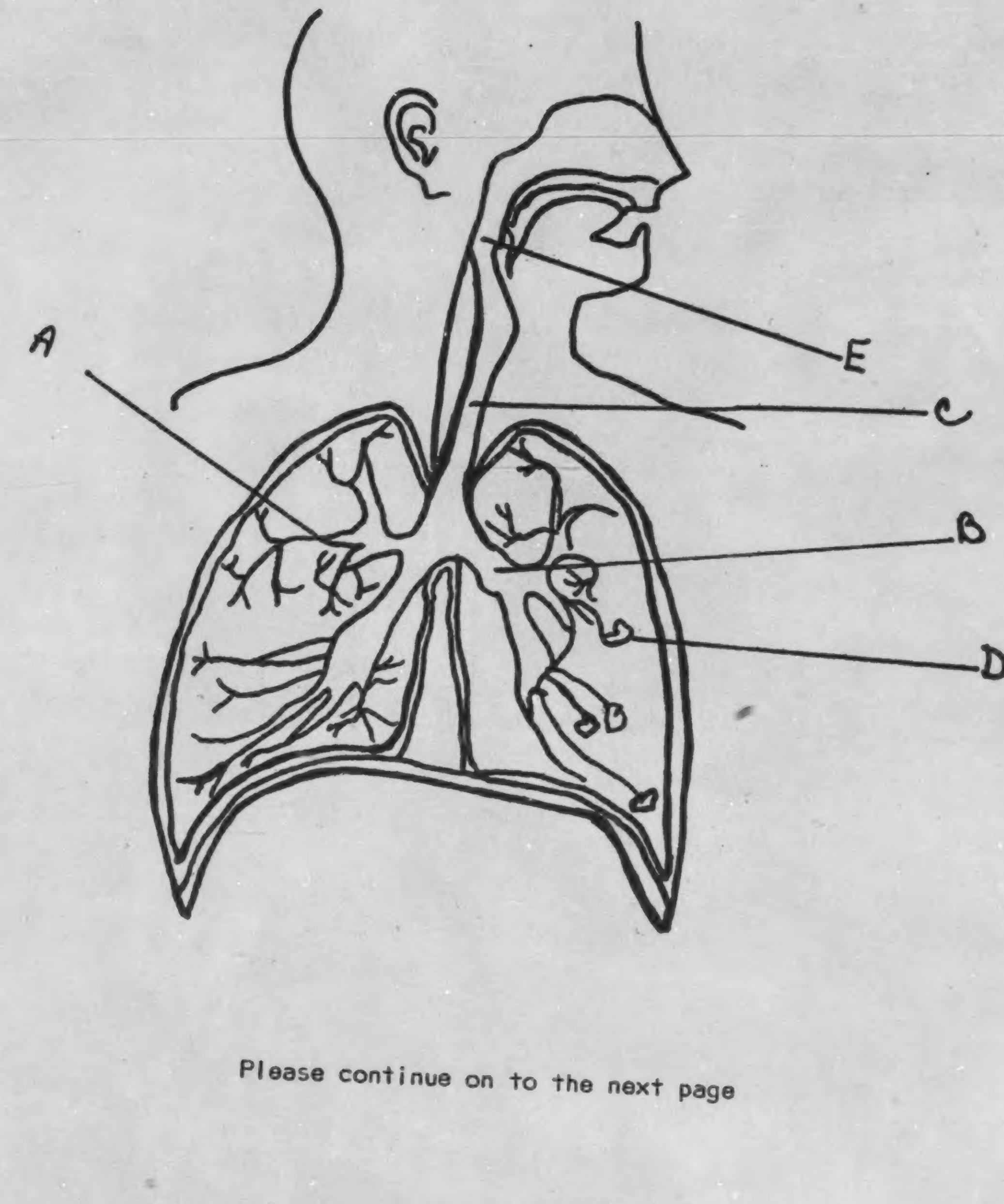
19. The larynx is commonly known as the:
    1. windpipe
    2. nasal cavity
    3. voice box
    4. throat

20. Blood with the least oxygen will be found in blood vessels:
    1. in the intestines
    2. going to the lungs
    3. in the legs
    4. coming from the lungs

21. Emphysema is most often associated with:
    1. lung cancer
    2. asthma
    3. glue sniffing
    4. cigarette smoking

Please continue on to the next page

22. Surrounding the alveoli are tiny:
    1. air sacs
    2. blood vessels
    3. bronchioles
    4. filters



Please continue on to the next page

The five questions below refer to the diagram on page 4.

23. The alveolus is labeled:
    1. A
    2. B
    3. C
    4. D

24. The bronchiole is labeled:
    1. A
    2. B
    3. C
    4. D

25. The bronchus is labeled:
    1. A
    2. B
    3. C
    4. D

26. The pharynx is labeled:
    1. A
    2. B
    3. C
    4. E

27. The trachea is labeled:
    1. B
    2. C
    3. D
    4. E

28. Which part of the blood carries most of its oxygen?
    1. red blood cells
    2. white blood cells
    3. platelets
    4. plasma

29. A heart murmur usually means that:
    1. the ventricles are not completely full of blood
    2. blood is leaking through a heart valve or another opening in the heart
    3. the right ventricle contraction is weaker than the left ventricle contraction
    4. air leaks from the left lung near the heart

Please continue on to the next page

30. The blood vessels where the tissues and organs actually receive their oxygen are called:
    1. veins
    2. arteries
    3. capillaries
    4. alveoli

31. Atherosclerosis can occur:
    1. only in the heart
    2. any place in the body
    3. only in the brain
    4. any place where there are blood clots

32. Channels that carry blood away from the heart are called:
    1. veins
    2. vena cavae
    3. capillaries
    4. arteries

33. The foods which we should watch most carefully to prevent atherosclerosis are:
    1. vegetable oils
    2. animal fats
    3. proteins
    4. sugars

34. A patient with an enormous white blood-cell count and many immature white corpuscles is probably a victim of:
    1. pernicious anemia
    2. iron-deficiency anemia
    3. hemophilia
    4. leukemia

35. The heart sounds are produced by the:
    1. coronary artery
    2. heart chambers
    3. heart valves
    4. heart muscle

36. Which organ controls heart rate?
    1. brain
    2. lungs
    3. kidneys
    4. pituitary

37. The presence of fatty deposits inside the arteries is called:
    1. atherosclerosis
    2. multiple sclerosis
    3. diverticulosis
    4. cirrhosis

Please continue on to the next page

38. When the blood pressure is taken, it measures the pressure of the blood in the:
    1. heart
    2. veins
    3. capillaries
    4. arteries

39. A blood clot or hemorrhage in an artery of the brain is called:
    1. encephalitis
    2. hypertension
    3. stroke
    4. arteriosclerosis

40. In pulmonary circulation the flow of blood is from the:
    1. lungs to the rest of the body and back to the lungs
    2. heart to the lungs and back to the heart
    3. heart to all parts of the body except the lungs and back to the heart
    4. lungs to the heart and back to the lungs

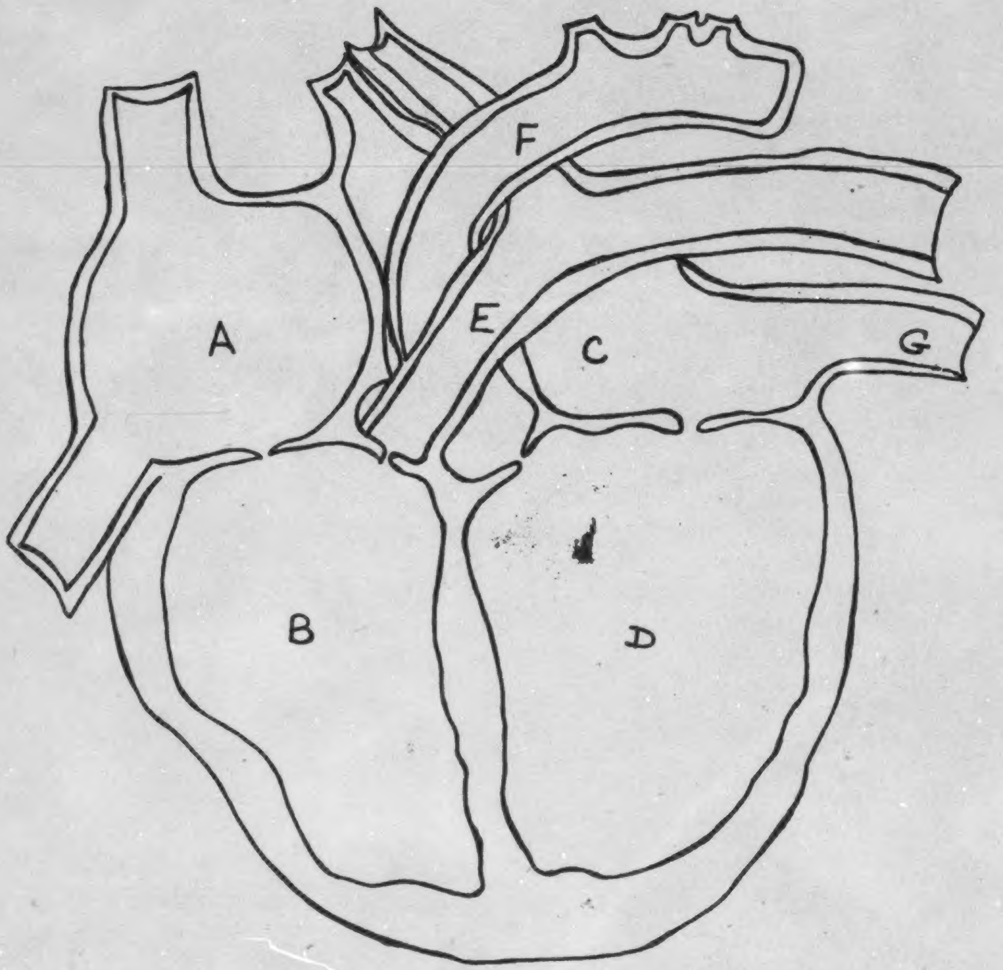
41. Coronary heart disease is a condition which begins in the:
    1. arteries in the heart
    2. veins in the heart
    3. muscles in the heart
    4. valves in the heart

42. The heart is divided in the middle by:
    1. the endocardium
    2. the aorta
    3. the septum
    4. the pericardium

43. Phlebitis is accompanied by a clot in:
    1. an artery
    2. a vein
    3. a capillary
    4. a heart chamber

44. White blood cells are vital because they:
    1. destroy bacteria
    2. carry oxygen
    3. carry food
    4. destroy tissue wastes

Please continue on to next page


F
A
E
C
G
B
D

The next five questions refer to the diagram on page 8.

45. The pulmonary vein is labeled:
    1. C
    2. E
    3. F
    4. G

46. The chamber which receives oxygenated blood from the lungs is labeled:
    1. A
    2. B
    3. C
    4. D

47. The vessel through which blood passes from the heart out to the rest of the body (except the lungs) is labeled:
    1. C
    2. E
    3. F
    4. G

48. The vessel through which blood goes to lungs for oxygen is labeled:
    1. C
    2. E
    3. F
    4. G

49. The chamber that pumps blood to the body (except for the lungs) is labeled:
    1. A
    2. B
    3. C
    4. D

For each definition in the right column, find the word in the left column which best matches it. Print the letter of that word in the blank space provided. PRINT NEATLY.

A. Diastolic
B. Hemoglobin
C. Hemophilia
D. Leukemia
E. Myocardium
F. Plasma
G. Rh factor
H. Systemic
I. Systolic

___ 50. Lowest blood pressure in an artery
___ 51. The liquid portion of the blood
___ 52. "Bleeder's disease"
___ 53. Muscular heart wall
___ 54. A disease in which a great excess of white corpuscles is formed
___ 55. The substance which makes blood red
___ 56. The principal circulation of blood throughout the body

Please continue on to the next page

57. The three main parts of the brain are the:
    1. frontal lobes, dendrites, and synapse
    2. medulla, cerebellum, and cerebrum
    3. medulla, cerebellum, and sensory area
    4. occipital lobes, cerebellum, and cerebrum

58. The stimulant drug often contained in "pep pills" is:
    1. cocaine
    2. nicotine
    3. phenobarbital
    4. benzedrine

59. The autonomic nervous system controls:
    1. higher mental processes
    2. involuntary actions of organs
    3. complex motor activity
    4. spinal reflexes

60. Myelinated nerve fibers may be destroyed in any part of the central nervous system in:
    1. multiple sclerosis
    2. shingles
    3. encephalitis
    4. muscular dystrophy

61. A dangerous drug, the possession or use of which is prohibited even to the medical profession, is:
    1. demerol
    2. morphine
    3. heroin
    4. cocaine

62. The most important factor in stroke prevention is:
    1. avoiding sudden changes in altitude
    2. maintaining good nutrition
    3. avoiding high blood pressure
    4. avoiding stress

63. The flexibility of the lens in a human eye is important in:
    1. protecting the pupil from possible injury
    2. focusing both near and distant objects
    3. determining speed of nerve impulses to the optic nerve
    4. controlling the amount of light striking the retina

64. The cerebral cortex is divided into four areas, called:
    1. hemispheres
    2. sulci
    3. gyri
    4. lobes

Please continue on to the next page

65. Marijuana is:
    1. an intoxicating drug made from the Indian hemp plant
    2. the most addicting of the opiate drugs
    3. a dried leaf chewed for its stimulating properties
    4. a poisonous substance in tobacco leaves

66. In general, the motor area in the left hemisphere of the brain controls movement:
    1. on the left side of the body
    2. on both sides of the body
    3. in the lower part of the body
    4. on the right side of the body

67. "Senility" - the mental changes associated with old age in some people - is most often caused by:
    1. arteriosclerosis
    2. cerebral palsy
    3. meningitis
    4. brain tumor

68. If you were swimming in the ocean and suddenly saw a shark, the most important hormone your body would secrete to help you swim faster is called:
    1. pituitin
    2. adrenalin
    3. thyroxin
    4. testosterone

69. Which of the following conditions results in destruction of brain cells?
    1. complications of hepatitis
    2. iron deficiency anemia
    3. functional schizophrenia
    4. long-term abuse of alcohol

70. The nervous system acts with what else to produce strong feelings or emotions?
    1. certain glands
    2. sensory organs
    3. certain muscles
    4. the heart

71. Morphine is:
    1. a stimulant drug found in "pep pills"
    2. an intoxicating drug made from the Indian hemp plant
    3. a synthetic drug produced from coal tar, used to induce sleep
    4. an opium derivative used to kill pain

Please continue on to the next page

72. The brief rest that nerve cells need between transmission of messages is called the:
    1. reflex arc
    2. impulse
    3. refractory period
    4. motor pause

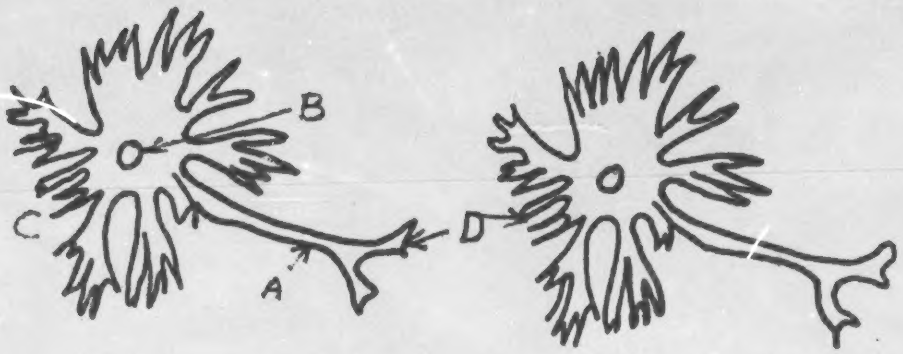
73. When you react to a mosquito on your arm by brushing it off, in what order do the neurons fire:
    1. sensory, association, motor
    2. motor, sensory, association
    3. motor, association, sensory
    4. sensory, motor, association

74. A venereal disease which ultimately results in serious psycho-motor disturbances is:
    1. gonorrhea
    2. cirrhosis
    3. syphilis
    4. urethritis

75. Opium is:
    1. the most addicting of the psychedelic drugs
    2. a natural narcotic from which other drugs are made
    3. a salt with a sedative effect
    4. a synthetic relative of cocaine, widely used in medicine

76. In humans, sensory nerves carry nerve impulses from:
    1. receptors to the central nervous system
    2. the central nervous system to receptors
    3. effectors to the central nervous system
    4. the central nervous system to effectors

Please continue on to the next page



77. The axon is labeled:
    1. A
    2. B
    3. C
    4. D

78. The synapse is labeled:
    1. A
    2. B
    3. C
    4. D

79. The dendrites are labeled:
    1. A
    2. B
    3. C
    4. D

80. The nucleus is labeled:
    1. A
    2. B
    3. C
    4. D

Please continue on to the next page

For each definition in the right column, find the organ system in the left column which best matches it. Print the letter of that word in the blank space provided. PRINT NEATLY.

A. Circulatory
B. Digestive
C. Endocrine
D. Excretory
E. integumentary
F. Muscular
G. Nervous
H. Reproductive
I. Respiratory
J. Skeletal

___ 81. Nasal passages, trachea, bronchi, lungs
___ 82. Ductless glands
___ 83. Brain, spinal cord, nerves, and sense organs
___ 84. Bones, cartilaginous structures, and ligaments of the body framework
___ 85. Heart, blood and lymph vessels, spleen
___ 86. Mouth and associated structures, esophagus, stomach, small intestine, large intestine (colon), pancreas, liver
___ 87. Skin, hair, nails
___ 88. Ovaries, testes, and associated organs
___ 89. Skeletal, smooth, and cardiac muscles
___ 90. Kidneys, ureters, urinary bladder, urethra, other organs with partial similar function, including lungs, skin, liver, and large intestine

You are now finished with the test. Thank you.

APPENDIX C

School-Related Questionnaire

Health-Related Questionnaire

	1. Much more than most	2. Somewhat more than most	3. About the same as most	4. Somewhat less than most	5. Much less than most
9. Work independently on school projects.	1	2	3	4	5
10. Ask questions of a teacher when not clear about a subject.	1	2	3	4	5
11. Talk to experts to get more information about a subject.	1	2	3	4	5
12. Use the science laboratory or lab equipment.	1	2	3	4	5
13. Explain a subject to a classmate who is having trouble understanding what to do.	1	2	3	4	5
14. Ask a classmate for help when I don't understand a problem or question.	1	2	3	4	5
15. Solve problems that come up with a health-related or science base.	1	2	3	4	5
16. Work hard in school.	1	2	3	4	5
17. Interest in school in general.	1	2	3	4	5
18. Learn on my own.	1	2	3	4	5
19. Absent from school.	1	2	3	4	5
20. Have concern about my body and physical health.	1	2	3	4	5
21. Follow the rules of the school.	1	2	3	4	5
22. Engage in school activities outside the classroom.	1	2	3	4	5
23. Am motivated to learn.	1	2	3	4	5
24. Have a feeling of self-confidence in the classroom.	1	2	3	4	5
25. Cooperate with other students.	1	2	3	4	5
26. Prefer to be the brightest in the class.	1	2	3	4	5
27. Able to apply facts learned in school to problems arising outside of school.	1	2	3	4	5

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Public Health Service
Center for Disease Control
Bureau of Health Education
Atlanta, Georgia 30333

OMB NO. 68S75038
APPROVAL EXPIRES June 1976

Place Code No. here.

☐

PART I

School Related Questionnaire

INSTRUCTIONS:

Below is a list of different behaviors related to things students do in school. In comparison with most people your age, how would you say you stand on each of the items? After reading each item, circle the number at the right that most nearly shows your behavior. For example, if you think you do something much more often than most people your age, circle the ① in the column labeled "Much more than most." If you think you do something somewhat less than most people your age, circle the number ④ in the column labeled "Somewhat less than most."

Read each statement carefully before giving your answer. Please answer every item.

	1. Much more than most	2. Somewhat more than most	3. About the same as most	4. Somewhat less than most	5. Much less than most
1. Use the public library to get more information on some special topic.	1	2	3	4	5
2. Read books on health subjects or science.	1	2	3	4	5
3. Use the school library to get more information on some special topic.	1	2	3	4	5
4. Complete homework assignments on time.	1	2	3	4	5
5. Participate in classroom discussions.	1	2	3	4	5
6. Participate in classroom projects.	1	2	3	4	5
7. Work on projects with other students as a member of a group.	1	2	3	4	5
8. Am interested in a career in a health field or science.	1	2	3	4	5

Please continue on to next page.

35. I try to decrease the amount of cholesterol in my diet by limiting the number of eggs and amount of saturated fat I eat:
    1. every time I am in a position to
    2. many times I am in a position to
    3. occasionally when I am in a position to
    4. never

36. I have a physical examination:
    1. twice or more per year
    2. once per year
    3. once every two years
    4. less than every two years

37. I have tried to convince one or more friends to quit smoking cigarettes.
    1. No
    2. Yes
    3. I have no friends who smoke cigarettes.

38. I brush my teeth:
    1. less than once per day (not every day)
    2. once per day
    3. twice per day
    4. more than twice per day

39. I usually take a bath or shower:
    1. once or twice per week or less often
    2. 3 or 4 times per week
    3. once per day
    4. more than once per day

40. The number of hours of sleep I try to get every night is:
    1. 5 or less
    2. 6 or 7
    3. 8 or 9
    4. 10 or more

41. The number of glasses of regular or non-fat milk I drink per day is:
    1. less than one
    2. 1 or 2
    3. 3 or 4
    4. 5 or more

42. If I get hungry between meals, I most often eat:
    1. candy or ice cream
    2. fruit or vegetables
    3. cookies or cake
    4. potato chips or pretzels
    5. something else
    6. I never eat between meals.

Please continue on to next page

PART 2

Health Related Questionnaire

Most people know what doctors and other health professionals say about good health habits, but we also know that it is not always possible to do all the things they suggest. Please circle the number with the choice that is most like your own behavior. All responses are confidential. Please answer every item.

28. I worry about my health:
    1. always
    2. often
    3. occasionally
    4. never

29. I take vitamin or iron tablets:
    1. daily
    2. often, but not every day
    3. occasionally
    4. never

30. I eat some type of green vegetable:
    1. every day
    2. 3-6 days per week
    3. 1 or 2 days per week
    4. less often or never

31. Outside of gym class, I hike, jog, ride a bike, or engage in some other active sport:
    1. never or almost never (less than once per month)
    2. occasionally (less than once per week, but more than once per month)
    3. often (once per week or more, but not every day)
    4. every day

32. The number of small bottles or cans of soft drink (cola, sodas, punch) I drink per week is, on the average:
    1. one or fewer
    2. 2-4
    3. 5-7
    4. 8 or more

33. I usually skip breakfast:
    1. 6-7 mornings per week
    2. 4-5 mornings per week
    3. 1-3 mornings per week
    4. less than one morning per week

34. I try to eat foods from each of the "basic four" groups: dairy products, meat and eggs, fruits and vegetables, bread and cereals:
    1. 6-7 days per week
    2. 4-5 days per week
    3. 2-3 days per week
    4. 1 day per week or less

Please continue on to next page.

52. I have tried to convince younger people not to start smoking cigarettes.
    1. No
    2. Yes

53. I know how to administer mouth-to-mouth resuscitation.
    1. No
    2. Yes

54. During the past three years, I have worked with retarded or physically handicapped people or with people in homes for the aged:
    1. regularly, about once a week or more
    2. periodically, on the average of once a month
    3. occasionally, about every few months
    4. never, or hardly ever

55. During the past three years, I have been active in efforts outside of school to improve the environment:
    1. regularly, about once a week or more
    2. periodically, on the average of once a month
    3. occasionally, about every few months
    4. never, or hardly ever

56. During the past three years, I have helped in campaigns to elect candidates for office who included on their platforms a plan for either improving the environment or bettering the health of the people:
    1. Yes on one occasion
    2. Yes on more than one occasion
    3. No

57. If and when I ride in an automobile, I fasten the seat belt:
    1. all of the time
    2. most of the time
    3. occasionally
    4. never

58. During the past three years, I tried to influence others to quit cigarette smoking:
    1. Yes, one person
    2. Yes, more than one person
    3. No

59. During the past three years, I have engaged in efforts to reduce smoking in public places:
    1. Yes
    2. No

You are now finished with this questionnaire. Thank you.

43. The amount of non-decaffeinated coffee I drink is:
    1. more than one cup per day
    2. 5-7 cups per week
    3. 2-4 cups per week
    4. one or fewer cups per week
    5. none, I drink decaffeinated coffee only
    6. none, I don't drink coffee at all

44. I drink alcoholic beverages:
    1. frequently (more than once per month)
    2. occasionally (about once per month)
    3. seldom (less than once per month)
    4. never (or only on special family or religious occasions)

45. I try to eat so that my daily intake of calories is right for my needs:
    1. always (almost 100% of the time)
    2. usually (about 75% of the time)
    3. sometimes (about 50% of the time)
    4. seldom (about 25% of the time or less)

46. I wash my hands before eating:
    1. always (before every meal)
    2. usually (before most meals)
    3. occasionally (before few meals)
    4. never or almost never

47. I drink a glass of fruit juice or eat a fresh citrus fruit:
    1. twice per day or more
    2. about once per day
    3. about once every few days
    4. less often than this
    5. never

48. I have tried to convince one or more relatives to quit smoking cigarettes.
    1. Yes
    2. No
    3. I have no relatives who smoke cigarettes.

49. I have a dental examination:
    1. less than every two years
    2. about once every two years
    3. about once a year
    4. about twice a year or more

50. I do things that I know will endanger my health:
    1. quite often
    2. sometimes
    3. hardly ever
    4. never

51. At this point in your life, who is more responsible for your health?
    1. my parents are
    2. I am

Please continue on to next page

APPENDIX D

Teenagers' Self Test: Cigarette Smoking

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Public Health Service
Center for Disease Control
Bureau of Health Education
Atlanta, Georgia 30333

OMB NO. 68S75038
APPROVAL EXPIRES June 1976

Place Code No. here.

TEENAGERS' SELF TEST

Cigarette Smoking

SECTION I

INSTRUCTIONS: READ EACH STATEMENT CAREFULLY BEFORE GIVING YOUR ANSWER. These are statements that some teenagers have made about cigarette smoking and cigarette smokers. Some of the statements are directly related to smoking; some are not as directly related. You may agree or disagree with these statements. After reading each statement, circle the number that most nearly shows how you feel about the statement. For example, if you strongly agree with the statement, circle the number in the column labeled "STRONGLY AGREE". If you disagree, but not very strongly, circle the number in the column labeled "DISAGREE".

(Answer every item in this section).	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Adults who smoke risk getting serious lung or heart disease.	5	4	3	2	1
2. Cigarette smokers don't think enough about how their smoking bothers non-smokers.	5	4	3	2	1
3. Most girls start smoking cigarettes to try to become more popular.	5	4	3	2	1
4. People smoke cigarettes to make everyday life less boring.	1	2	3	4	5
5. Teenagers who smoke cigarettes are more likely to be troublemakers than those who don't.	5	4	3	2	1
6. I feel good knowing I can turn to my parents for advice.	5	4	3	2	1
7. Making something of my life is important to me.	5	4	3	2	1
8. It's okay for teenagers to experiment with cigarettes if they quit before it becomes a habit.	1	2	3	4	5

Please continue on to next page

(Answer every item in this section).	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
9. People can become addicted to cigarettes just as they can to alcohol or drugs.	5	4	3	2	1
10. I prefer the company of boys who don't smoke.	5	4	3	2	1
11. Most boys start smoking cigarettes because most of their friends smoke.	5	4	3	2	1
12. People smoke cigarettes to help them think more clearly.	1	2	3	4	5
13. A person who smokes is more of a follower than one who doesn't smoke.	5	4	3	2	1
14. Punishing kids for smoking cigarettes is useless.	1	2	3	4	5
15. I use my own set of values to decide what I will or will not do.	5	4	3	2	1
16. Cigarette smoking is harmful only if a person inhales.	1	2	3	4	5
17. Even though lung cancer and heart disease can be caused by other things, smoking cigarettes still makes a real difference.	5	4	3	2	1
18. It seems that more and more non-smokers complain about having someone smoke near them.	5	4	3	2	1
19. Most girls start smoking cigarettes to try to attract boys.	5	4	3	2	1
20. Smoking cigarettes can help you enjoy life more.	1	2	3	4	5
21. Kids who smoke are show-offs.	5	4	3	2	1

Please continue on to next page

(Answer every item in this section).	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
22. Adults try to stop teenagers from smoking just to show their power.	1	2	3	4	5
23. I don't want to get hooked on anything, including cigarettes.	5	4	3	2	1
24. There is no danger in smoking cigars or pipes.	1	2	3	4	5
25. Cigarette smoking can harm the health of teenagers.	5	4	3	2	1
26. Cigarette smoke smells bad.	5	4	3	2	1
27. Most boys start smoking cigarettes to try to become more popular.	5	4	3	2	1
28. Cigarette smokers are usually easy-going people.	1	2	3	4	5
29. Parents who smoke set a bad example for their children.	5	4	3	2	1
30. I often do things even when I know inside myself that they are not the right thing to do.	1	2	3	4	5
31. I can control the kind of person I will become.	5	4	3	2	1
32. Cigarettes low in tar and nicotine can't harm your health.	1	2	3	4	5
33. Cigarette smoking can harm you even after smoking for only a year.	5	4	3	2	1
34. Cigarette smokers should be kept apart from non-smokers in public places.	5	4	3	2	1
35. Most girls start smoking cigarettes because most of their friends smoke.	5	4	3	2	1

Please continue on to next page

(Answer every item in this section).	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
36. People who smoke seem to be more at ease with others.	1	2	3	4	5
37. Teenagers start to smoke as a way of rebelling against their parents.	5	4	3	2	1
38. Teenagers should do what their parents tell them to do.	5	4	3	2	1
39. I do not want to be just one of the crowd.	5	4	3	2	1
40. Teenagers who smoke regularly can quit for good any time they like.	1	2	3	4	5
41. Even if cigarettes don't kill you, they can cut down on what you might get out of life.	5	4	3	2	1
42. I prefer the company of girls who don't smoke.	5	4	3	2	1
43. Most boys start smoking cigarettes to try to attract girls.	5	4	3	2	1
44. Smoking cigarettes gives you a good feeling.	1	2	3	4	5
45. Teenage smokers think they are grown-up, but they really aren't.	5	4	3	2	1
46. It annoys me that my parents have so much control over the things I want to do.	1	2	3	4	5
47. I believe the health information about smoking is true.	5	4	3	2	1
48. If I have children, I hope they never smoke cigarettes.	5	4	3	2	1
49. If you don't smoke cigarettes, other teenagers put you down.	5	4	3	2	1
0. People smoke cigarettes to calm their nerves.	1	2	3	4	5

Please continue on to next page

(Answer every item in this section).	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
51. People smoke cigarettes to try to escape from troubles they face.	5	4	3	2	1
52. I wish I were older than I am now.	1	2	3	4	5
53. It's better not to start smoking than to have to stop.	5	4	3	2	1
54. Cigarettes are a form of air pollution.	5	4	3	2	1
55. Students who smoke cigarettes tend to be more popular.	5	4	3	2	1
56. Smoking cigarettes seems to make good times even better.	1	2	3	4	5
57. Teenage smokers think they look cool, but they don't really.	5	4	3	2	1
58. A teenager should be able to do the things he wants to do when he wants to do them.	1	2	3	4	5
59. There's nothing wrong with smoking cigarettes as long as you don't smoke too many.	1	2	3	4	5
60. Cigarette smoking should be forbidden inside public places.	5	4	3	2	1
61. I am under pressure from my friends to smoke.	5	4	3	2	1
62. People who smoke are usually more sociable than people who don't.	1	2	3	4	5
63. Cigarette smoking is only a minor health problem.	1	2	3	4	5
64. If I smoke around other people, I take away their right to breathe clean air.	5	4	3	2	1

Please continue on to next page

SECTION II

INSTRUCTIONS: The following is a list of general information questions about you and others around you. In questions where the word "parents" appears, "parents" means mother or father or guardians you are living with now. Place a check mark next to the response that best answers each question.

65. How old are you now?

1______ 11 or younger
2______ 12
3______ 13
4______ 14
5______ 15
6______ 16 or older

66. Are you?

1______ Male
2______ Female

67. What grade are you in?

1______ 7th
2______ 8th
3______ 9th
4______ 10th
5______ 11th

68. How would you rate your health?

1______ Excellent
2______ Good
3______ Fair
4______ Poor

69. Do your parents (or guardians) smoke cigarettes?

1______ yes, both parents
2______ yes, father only
3______ yes, mother only
4______ no, neither parent smokes

70. How many older brothers or sisters do you have living at home?

1______ 0 (skip item #71)
2______ 1
3______ 2
4______ 3
5______ 4 or more

71. If you have older brothers or sisters living at home, how many smoke cigarettes?

1______ 0
2______ 1
3______ 2
4______ 3
5______ 4 or more

72. Of your four best friends, how many smoke cigarettes?

1______ 4 smoke
2______ 3 smoke
3______ 2 smoke
4______ 1 smokes
5______ none smokes

73. Do you think you will be smoking 5 years from now?

1______ definitely yes
2______ probably yes
3______ probably not
4______ definitely not

74. What % of adults in the United States would you guess smoke cigarettes? (Check only one)

1______ up to 20%
2______ 20% to 39%
3______ 40% to 59%
4______ 60% to 79%
5______ 80% to 100%

75. What % of teenagers your age in the United States would you guess smoke cigarettes? (Check only one)

1______ up to 20%
2______ 20% to 39%
3______ 40% to 59%
4______ 60% to 79%
5______ 80% to 100%

76. What percent of adults in the United States would you guess have stopped smoking for good? (Check one only)

1______ up to 20%
2______ 20% to 39%
3______ 40% to 59%
4______ 60% to 79%
5______ 80% to 100%

77. How many cigarettes have you smoked in your life?

1______ none
2______ fewer than 100 cigarettes
3______ 100 or more cigarettes

78. Do you now smoke cigarettes?

1______ yes
2______ no

ONLY IF YOU NOW SMOKE CIGARETTES, ANSWER ITEMS #79, 80, AND 81.

79. About how often do you smoke?

1______ once a month or less often
2______ a few times a month
3______ a few times a week
4______ every day or just about every day

If you smoke every day or just about every day: How many cigarettes do you smoke in a day?

5______ 1 or less a day
6______ 2 to 4 a day
7______ 5 to 9 a day
8______ 10 to 19 a day
9______ 20 or more a day

80. How long have you been smoking?

1______ less than 3 months
2______ 3 months to 6 months
3______ more than 6 months but less than 1 year
4______ 1 to 2 years
5______ over 2 years

81. Do you want to stop smoking cigarettes for good, or do you want to continue?

1______ want to continue
2______ want to stop for good

EVERYONE ANSWER THE FOLLOWING:

82. Which Health Curriculum unit or units did you take? (Read all choices first, then check only one answer)

1______ None
2______ Lung & Heart & Brain
3______ Lung & Heart only
4______ Lung & Brain only
5______ Heart & Brain only
6______ Lung (5th grade) only
7______ Heart (6th grade) only
8______ Brain (7th grade) only

83. If you had any of these special units in 5th, 6th or 7th grade, how do you feel that having them influenced your decision so far about cigarette smoking?

1______ I did not have the units
2______ It kept me from smoking cigarettes
3______ It made me want to try smoking cigarettes
4______ It made me want to stop smoking cigarettes
5______ It had no influence on me one way or the other

Please continue on to next page

84. If you had these special units in 5th, 6th, or 7th grade, how do you feel that having them will influence a future decision to smoke cigarettes?

1______ I did not have the units
2______ It will prevent me from starting to smoke
3______ It will influence me to want to smoke
4______ It will influence me to stop smoking cigarettes
5______ It will have no influence on me one way or the other

85. Have you had courses in school other than the special Health units which have given you information on the dangers of cigarette smoking?

1______ no
2______yes. What were the courses?
____

86. Have you been influenced to smoke cigarettes or not to smoke by ads for cigarettes from radio, T.V., magazines, or newspapers?

1______ no, not influenced
2______ yes, influenced toward smoking
3______ yes, influenced not to smoke

87. Have you been influenced to smoke cigarettes or not to smoke by ads or articles against cigarette smoking from radio, T.V., magazines, or newspapers?

1______ no, not influenced
2______ yes, influenced toward smoking
3______ yes, influenced not to smoke

You are now finished with the test. Thank you.

APPENDIX E

Description of Scales and Items in each Scale from Teenagers' Self-Test: Cigarette Smoking

34. Cigarette smokers should be kept apart from non-smokers in public places.

42. I prefer the company of girls who don't smoke.

48. If I have children, I hope they never smoke cigarettes.

54. Cigarettes are a form of air pollution.

60. Cigarette smoking should be forbidden inside public places.

64. If I smoke around other people, I take away their right to breathe clean air.

Scale 3 "Positive" Smoker Attributes: SA5 - SD1; higher score denotes agreement that smokers smoke to be popular, look grown-up, attract opposite sex, etc. (non-smokers get higher scores).

item #

3. Most girls start smoking cigarettes to try to become more popular.

11. Most boys start smoking cigarettes because most of their friends smoke.

19. Most girls start smoking cigarettes to try to attract boys.

27. Most boys start smoking cigarettes to try to become more popular.

35. Most girls start smoking cigarettes because most of their friends smoke.

43. Most boys start smoking cigarettes to try to attract girls.

49. If you don't smoke cigarettes, other teenagers put you down.

55. Students who smoke cigarettes tend to be more popular.

61. I am under pressure from my friends to smoke.

Scale 4 Direct Affect: "Benefits:" SA1 - SD5; higher score denotes disagreement with benefits of smoking such as making life easier, less boring, good feeling, calm nerves, etc. (non-smokers get higher scores).

item #

4. People smoke cigarettes to make everyday life less boring.

12. People smoke cigarettes to help them think more clearly.

20. Smoking cigarettes can help you enjoy life more.

28. Cigarette smokers are usually easy-going people.

36. People who smoke seem to be more at ease with others.

Description of Scales from Teenager's Self Test:

Cigarette Smoking

Scale 1 Health Concern, Cost: SA5 - SD1; higher score denotes agreement that smoking is harmful (non-smokers get higher scores).

item #

1. Adults who smoke risk getting serious lung or heart disease.

9. People can become addicted to cigarettes just as they can to alcohol or drugs.

17. Even though lung cancer and heart disease can be caused by other things, smoking cigarettes still makes a real difference.

25. Cigarette smoking can harm the health of teenagers.

33. Cigarette smoking can harm you even after smoking for only a year.

41. Even if cigarettes don't kill you, they can cut down on what you might get out of life.

47. I believe the health information about smoking is true.

53. It's better not to start smoking than to have to stop.

59. There's nothing wrong with smoking cigarettes as long as you don't smoke too many.

63. Cigarette smoking is only a minor health problem.

Scale 2 Non-Smokers Rights: SA5 - SD1; higher score denotes agreement with non-smokers right to breathe clean air (non-smokers get higher scores).

item #

2. Cigarette smokers don't think enough about how their smoking bothers non-smokers.

10. I prefer the company of boys who don't smoke.

18. It seems that more and more non-smokers complain about having someone smoke near them.

26. Cigarette smoke smells bad.

* Numbers refer to order of items in the experimental version of the Self Test.

Scale 7 Destiny Control; Independence: SA5 - SD1; higher score denotes agreement with ability to control life, not get hooked on anything, become what one wants, etc. (non-smokers get higher scores).

item #

7. Making something of my life is important to me.

15. I use my own set of values to decide what I will or will not do.

23. I don't want to get hooked on anything, including cigarettes.

31. I can control the kind of person I will become.

39. I do not want to be just one of the crowd.

Scale 8 Rationalization: SA1 - SD5; higher score denotes disagreement with rationalizations for smoking such as "okay to experiment before it becomes a habit," "low tar & nicotine can't harm health," etc. (non-smokers get higher scores).

item #

8. It's okay for teenagers to experiment with cigarettes if they quit before it becomes a habit.

16. Cigarette smoking is harmful only if a person inhales.

24. There is no danger in smoking cigars or pipes.

32. Cigarettes low in tar and nicotine can't harm your health.

40. Teenagers who smoke regularly can quit for good any time they like.

44. Smoking cigarettes gives you a good feeling.

50. People smoke cigarettes to calm their nerves.

56. Smoking cigarettes seems to make good times even better.

62. People who smoke are usually more sociable than people who don't.

Scale 5 Negative Smoker Attributes: SA5 - SD1; higher score denotes agreement that smokers are show-offs, troublemakers, think they look grown-up & cool but aren't, etc. (non-smokers get higher scores).

item #

5. Teenagers who smoke cigarettes are more likely to be troublemakers than those who don't.

13. A person who smokes is more of a follower than one who doesn't smoke.

21. Kids who smoke are show-offs.

29. Parents who smoke set a bad example for their children.

37. Teenagers start to smoke as a way of rebelling against their parents.

45. Teenage smokers think they are grown-up, but they really aren't.

51. People smoke cigarettes to try to escape from troubles they face.

57. Teenage smokers think they look cool, but they don't really.

Scale 6 Parental Control, Authority: SA1 - SD5; higher score denotes disagreement with rebellion against parents, with doing "things he wants to do when he wants to," with "doing things even if know inside they aren't right," etc. (non-smokers get higher scores).

item #

6. I feel good knowing I can turn to my parents for advice.

14. Punishing kids for smoking cigarettes is useless.

22. Adults try to stop teenagers from smoking just to show their power.

30. I often do things even when I know inside myself that they are not the right thing to do.

38. Teenagers should do what their parents tell them to do.

46. It annoys me that my parents have so much control over things I want to do.

52. I wish I were older than I am now.

58. A teenager should be able to do the things he wants to do when he wants to do them.

APPENDIX F

Tables

Table F-2

Summary of Significance Tests of Grade Hypothesis (Phase 2 - Kanawha CONTROLS)

	9th (N=218)	10th (N=58)	11th (N=161)
Knowledge Tests			
Total	**176.6	200.5	202.9
Lung	** 9.7	12.2	12.9
Heart	** 9.2	11.8	11.3
Brain	** 9.4	11.3	12.5
Health-Related Behavior	51.56	51.70	53.71
Smoking Kit Attitude Scales			
Scale 1	40.52	41.76	41.53
Scale 2	36.83	37.48	37.23
Scale 3	* 27.23	26.9	25.48
Scale 4	29.85	30.81	30.53
Scale 5	* 26.30	25.1	24.90
Scale 6	24.69	25.59	24.97
Scale 7	* 20.66	21.2	21.35
Scale 8	18.00	17.90	18.54
Percent Smokers	32.9	40.0	35.00
School-Related Behavior	76.92	73.35	77.36

---

* $p < .05$; ** $p < .01$

Brackets indicate groups which are significantly different from each other. Where no brackets exist, post-tests failed to show significant group differences.

Table F-1

Summary of Significance Tests of District Hypothesis

	Phase 1-Heart Units		Phase 2-11th Grade CONTROLS		
	Kanawha (N=92)	W. Genesee (N=52)	Bethlehem	Kanawha	W. Genesee
Knowledge Tests			(N=160)	(N=161)	
Total	---	---	**224.7	202.9	-------
Lung	---	---	** 17.4	12.9	-------
Heart	---	---	** 15.7	12.7	-------
Brain	---	---	** 15.5	12.5	-------
Health-Related Behavior			(N=172)	(N=183)	(N=156)
	---	---	53.81	53.71	54.57
Smoking Kit Attitude Scales					
Scale 1	40.62	39.99	---	---	---
Scale 2	36.16	36.23	---	---	---
Scale 3	**25.03	27.17	---	---	---
Scale 4	31.01	30.10	---	---	---
Scale 5	26.46	25.60	---	---	---
Scale 6	24.59	23.42	---	---	---
Scale 7	20.92	20.36	---	---	---
Scale 8	18.41	17.98	---	---	---
			(N=173)	(N=177)	
Percent Smokers	25.0	23.1	31.8	35.0	---
			(N=172)	(N=182)	(N=154)
School-Related Behavior	---	---	77.24	77.36	77.23

** P ∠.01

Table F-4

Correlation coefficients between Health Knowledge Test Scores and Curriculum Exposure Indices

	Curriculum Exposure I		Curriculum Exposure 2	
	9th grade N=1209	10th grade N=521	9th grade N=948	10th grade N=384
Total Score	.271**	.137**	.187**	.088*
Lung Score	.273**	.119**	.212**	.088*
Heart Score	.279**	.190**	.215**	.147**
Brain Score	.174**	.083*	.126**	.018

Note: Curriculum Exposure I contains four groups: Controls versus single-units versus double-units versus triple-units; Curriculum Exposure 2 contains three groups: single-units versus double-units versus triple units.

* $p < .05$ level of significance
** $p < .01$ level of significance

Table F-3

Summary of Treatment and Level of Dosage Analyses for Health Knowledge Test Scores -- Means, Ns, and Significant Differences

Kanawha	Grade 9 L/H (N=118)	Grade 9 L (N=77)	Grade 9 H (N=41)	Grade 9 Controls (N=218)	Grade 10 L/H (N=58)	Grade 10 L (N=53)	Grade 10 H (N=71)	Grade 10 Controls (N=58)
Total Score	** 189.74	191.69	187.25	179.56	** 217.80	219.56	213.03	200.54
Lung Score	** 12.52	11.25	10.24	9.74	** 15.28	15.53	14.18	12.22
Heart Score	** 11.22	10.36	11.10	9.27	** 14.52	14.25	14.00	11.79
Brain Score	9.87	** 11.14	9.68	9.45	13.52	** 13.94	13.17	11.34

Bethlehem	Grade 9 L/H/B (N=181)	Grade 9 H/B (N=96)	Grade 9 B (N=28)	Grade 9 Controls (N=4[illegible])	Grade 10 H/B (N=50)	Grade 10 B (N=152)	Grade 10 Controls (N=79)
Total Score	** 209.12	195.37	185.32	195.16	225.15	215.30	216.00
Lung Score	** 14.75	11.80	10.54	12.14	17.06	15.22	15.54
Heart Score	** 14.19	12.38	9.89	11.21	** 16.00	13.32	13.24
Brain Score	** 12.46	10.60	10.39	11.67	14.70	14.20	14.16

0-1 5 2
7/1
1-2 1
1-3 3/
0-3 1/
1/

[illegible]

** p ∠ .01 F-Ratio levels of significance

Note: Brackets indicate groups which are significantly different from each other as determined by post-tests. Where no brackets exist, post-tests failed to show significant group differences.

Table F-5

Summary of Comparisons Between Experimental and Control Subjects on Health Knowledge tests

	Mean Health Knowledge Test Score			
	Total	Lung	Heart	Brain
Kanawha				
Grade 9				
Experimentals (N=236)	189.94	11.71	10.92	10.25
Controls (N=218)	179.56	9.74 **	9.27 **	9.45
Grade 10				
Experimentals (N=182)	216.45	14.92	14.24	13.51
Controls (N=58)	200.54	12.22	11.79	11.34
Bethlehem				
Grade 9				
Experimentals (N=305)	202.60	13.43	13.23 *	11.69
Controls (N=43)	195.16	12.14	11.21	11.67
Grade 10				
Experimentals (N=202)	217.74	15.68	13.99	14.32
Controls (N=79)	216.00	15.54	13.24	14.16

---

* p ∠.05 level of significance

** p ∠.01 level of significance

APPENDIX G

Evaluation of National Norm Group for Use as Controls in Present Study

but the test
non-significant.
See p. 12

EVALUATION OF NATIONAL NORM GROUP FOR USE AS CONTROLS IN PRESENT STUDY

A national sample drawn in the Spring of 1973 was used as a basis for constructing norms for the Teenage Self Test. In order to use this national group as a "control", demographic differences between the national and present experimental groups which might affect the comparisons, were tested. To the extent that a demographic variable was found to have an effect on the criterion of smoking behavior, the national group would be weighted on that variable to conform to the structure of the experimental group. To accomplish this, an Automatic Interaction Detection (AID) was run with smoking behavior as the criterion variable and four demographic variables as partitioning items as follows:

- region of the country
- sex
- percentage of minority enrollment. Minority status was not available on an individual basis, but each student was assigned the value of the minority proportion for his school.* Six groupings were used (from under 11% minority to over 91% minority) with roughly equal numbers of students in each grouping.
- grade location. Students were grouped according to whether ninth grade in their schools was (1) the highest grade in their school (i.e., junior high school), (2) the lowest grade in the school (i.e., high school) or (3) an intermediate grade in the school.

Since no such relationship was found for any of the variables, the national group was used, unweighted, as a "control" group.

---

* Obtained from "Directory of Public Elementary and Secondary Schools in Selected Districts: Enrollment and Staff by Racial/Ethnic Group"; U.S. Dept. of HEW, Office for Civil Rights. OCR 74-5, Fall 1972.

APPENDIX H

Parental Consent Letter

Dear Parent:

May we have your consent for your child to take part in a Public Health Service study of the effectiveness of health education.

While children will not be asked to indicate their names on questionnaires, there will be an identification number. When the last questionnaire has been completed, the link between name and number will no longer exist. The purpose of this number is to make it possible to bring together the several questionnaires which each child will fill out at different times so that changes which occur in pupils' health knowledge, attitudes, and behavior can be observed. This list linking names and numbers will be available to the School Administrator's Office only. Thus, the response of your child will not be identified with his or her name, no one will ever be able to link the two, and it will be impossible to pass information identified with individual pupils on to anyone.

If you agree to have your child participate, please sign your name below and return the form to your child's school.

Signed______________________________
School Representative

- -

I give my consent for ______________________________ to fill out the questionnaires relating to effectiveness of health education courses.

Signed______________________________
Parent or Guardian

APPENDIX I

Instrument Reliabilities

Teenage Self Test: Cigarette Smoking

Statistic: Kuder Richardson Formula 20**

$$r_{tt} = \left(\frac{n}{n-1}\right)\left(\frac{\sigma_t^2 - \sum^{n} pq}{\sigma_t^2}\right)$$

where n = number of items
p = proportion responding in a specific manner
q = 1-p

Finding:

Scale	# Items	KR 20
1	10	.78
2	10	.83
3	9	.79
4	9	.70
5	8	.78
6	8	.60
7	5	.50
8	5	.50

Health Knowledge Test (Total)

Statistic: Same as above

Finding: $r_{tt} = .93$

**Op.cit. p.458

Instrument Reliabilities

School Related Behavior Inventory

Statistic: Reliability estimated from item-test correlations, a derivation of the Spearman Brown formula.*

$$r_{tt} = \frac{nr^2}{1+(n-1)r_{it}^2}$$

where r_{tt} = mean of correlations of items with total test scores.

n = number of

r_{it} = mean of correlations between item I and total test score, a point

Finding: r_{tt} = .91

Health Related Behavior Inventory

Statistic: Same as for School Related Behavior Inventory

Finding: r_{tt} = .74 Very good for a 35-item test!

---

* Guilford, J.P., "Fundamental Statistics in Psychology and Education. New York: Mc Graw-Hill Book Company., 1965. p. 463

The University of Iowa
Iowa City, Iowa 52242

University of Iowa Hospitals and Clinics
Department of Internal Medicine

(319) 356-2883
If no answer, 356-1616

1847

- Tests of Cardiovascular understanding [illegible]
- Standardized Iowa Test of Basic Skills

4.

April 20, 1976

Roy L. Davis, Director
Community Program Development Division
Bureau of Health Education
Atlanta, Georgia 30333

Dear Mr. Davis:

Thank you for the copy of the Coleman Report which you sent us. I have read it carefully and can see that it was a major effort in attempting to evaluate the School Health Curriculum Project. I was not previously aware of its existence, and so we have designed our evaluation along similar but more specific lines. The Iowa Heart Association has been extremely active in promoting the Berkeley Project in Iowa, and we have been working in cooperation with them to independently assess the effect of this project on cardiovascular health knowledge.

To assure an independent evaluation, we devised our own tests of cardiovascular health knowledge. We proposed to a panel of cardiovascular medical educators the question, "What constitutes the minimum amount of knowledge of the cardiovascular system a person should possess in order for him(her) to make intelligent decisions regarding his(her) cardiovascular health?" In response to this question, 44 specific concepts were identified. We then constructed formal written instructional objectives for each conceptual area. Experts in cardiovascular diseases and in continuing medical education then were asked to select from this list those concepts and objectives considered to be of major relevance. Three hundred questions were prepared for preliminary evaluation.

We have been extremely fortunate in this project to have the cooperation and assistance of the Educational Measurement Section of the College of Education, and with their help we were able to administer this test in conjunction with the standardized Iowa Test of Basic Skills. The Iowa Test of Basic Skills tests approximately 300,000 pupils annually in Iowa. They were willing to participate in this project, and administered the cardiovascular health test to a representative sample of these students. Our first objective was to develop normative data for 6th, 7th, and 8th grade students. We selected 1500 students at each grade level randomly distributed throughout the State on a geographic and population density basis. These tests have now been completed, and we are presently scoring them and subjecting the data to factor analysis. In addition we will correlate the results of these tests with scores in other areas obtained by the same students on the Iowa Test of Basic Skills. This should provide important information regarding how students do in this subject area in relation to other course areas.

Our second goal is to independently evaluate the Cardiovascular Unit of the Berkeley Project. In this we are concentrating only on the cognitive area, and at present have not attempted to evaluate in the affective domain. We plan to use a 50 question test composed of items tested for difficulty and discrimination from the larger group of questions used for norming data. We will test 6th grade students who have had the Cardiovascular Unit this year and 7th grade students who had the Cardiovascular Unit last year. These schools will be matched to control "sister schools." The matching process will be very carefully done and primary emphasis will be given to matching the schools on the basis of their composite score on the Iowa Test of Basic Skills. We intend to analyze the data in a very rigorous fashion.

I hope that we can test between 1200 and 1500 students in the 6th and 7th grades and compare them with an equal number of controls. I hope that the information that we are able to obtain will help in the evaluation of the Project. We have plans for some further longitudinal studies in the future. If these results would be of interest to you, I would be happy to hear from you.

Sincerely yours,

Carl W. White, M.D.
Assistant Professor of Medicine

em

Education & Public Affairs

JOSEPH G COLMEN, PRESIDENT
1200 EIGHTEENTH STREET, N. W., SUITE 1209
WASHINGTON, D. C. 20036

A STUDY OF IMPACT OF THE SCHOOL HEALTH CURRICULUM PROJECT ON KNOWLEDGE, ATTITUDE AND BEHAVIOR OF TEENAGE STUDENTS

Ann M. Milne, Ph.D.
Joanne Marshall-Mies, M.A.
Joseph G. Colmen, Ph.D.

Conducted under contract #CDC 21-74-508
Center for Disease Control
Bureau of Health Education
Community Program Development Division
Atlanta, Georgia

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
PUBLIC HEALTH SERVICE
CENTER FOR DISEASE CONTROL
ATLANTA, GEORGIA 30333

November 8, 1975

TABLE OF CONTENTS

		page
	Acknowledgements	i
I.	Preface: Background and Purpose of Study	1
II.	Impact Research Hypotheses	5
III.	Research Design and Procedure	6
IV.	Results - Testing the Hypotheses	15
V.	Limitations and Conclusions	37

APPENDICES

Appendix A - Development of Health Knowledge Test

Appendix B - Knowledge Test

Appendix C - School-Related Questionnaire and Health-Related Questionnaire

Appendix D - Teenagers' Self-Test: Cigarette Smoking

Appendix E - Descriptions of Scales and Items in each Scale from Teenagers' Self-Test: Cigarette Smoking

Appendix F - Tables

Appendix G - Evaluation of Norm Group for Use as Controls in Present Study

Appendix H - Parental Consent Letter

Appendix I - Instrument Reliabilities

Smoking Behavior

This measure, derived from self-reports in response to two behavior questions in the Teenage Self-Test, does not lend itself to meaningful reliability measurement axcept as it would be possible to obtain independent external verification of the students' behavior by reliable observers. Since such information, even if available, was beyond the scope of the study to collect, a measure of reliabilty for Smoking Behavior is not reported.

Acknowledgments

We wish to acknowledge the assistance provided in data collection by the cooperating school districts:

- Bethlehem Central Schools, Delmar, New York
- Cajon Valley Union School District, El Cajon, California
- Kanawha County Public Schools, Charleston, West Virginia
- Los Altos School District, Los Altos, California
- West Genesee Central Schools, West Genesee, New York

In particular, we are grateful for the direct personal assistance provided by Mr. Fred Burdick of Bethlehem, Ms. Margaret Wiilmon of Cajon Valley, Mr. Luther Cope of Kanawha County, Mr. Leonard Heid of Los Altos and Dr. Jack Calvert of West Genesee. It goes without saying that the research could not have been accomplished without the cocperation of hundreds of students in these locations and for that we are most appreciative.

Our working consultants provided valuable input in technical planning as well as toward selection of data analysis treatments employed. These included Dr. Ira Cisin, Director of the Social Research Group at George Washington University, and Dr. Philip H. Dubois, Professor of the Department of Psychology, Washington University, St. Louis, Missouri. Our initial technical monitor from the Center for Disease Control, Dr. Dorothy Green, participated with the external consultants in the design selection and helped to facilitate progress in numerous ways as the work proceeded. Mr. Roy Davis of the Center for Disease Control, Bureau of Health Education, served as project officer.

Within Education and Public Affairs, Dr. Ann M. Milne, served as principal investigator of Phase I of the project and for development of the design for Phase II. Ms. Joanne Marshall-Mies took over as principal investigator for completion of the analysis and report for Phase II. Ms. R. Elizabeth Stone was responsible principally for development of the Health Knowledge Test. Ms. Donna Pauletti contributed at various stages in data coding, editing and analysis, and in designing controls for the acquisition and handling of test and other materials.

Joseph G. Colmen, Ph.D.
Project Director

I. PREFACE: BACKGROUND AND PURPOSE OF STUDY

In 1967, the National Clearinghouse for Smoking and Health initiated development of a health education project directed at developing better understanding among youngsters of several of their body systems and at motivating them toward protecting themselves from disease. From this initial work, an experimental series of curriculum units was constructed and introduced in classrooms beginning in 1969. The program, originally called the Berkeley Health Project, has come to be known as the School Health Curriculum Project (SHCP).

The Curriculum Model

The health curriculum model consists of three intensive units of study--one each at the fifth, sixth and seventh grade levels comprising the respiratory, circulatory and nervous systems respectively. Each unit runs about eight to ten weeks during the school year, is comprehensive in its coverage of health education content, and involves maximal integration with other basic curriculum areas. The emphasis is on working toward the basic objectives of education, developing understanding and appreciation of the body and skills for prevention of disease, and encouraging youth to make sound decisions about personal and environmental factors that affect their own health. A wide variety of classroom education techniques and resources, material and human, is used. Considerable emphasis is placed on stimulating pupil motivation through individual and small group activity, through dealing with real life issues, and through involvement of school administrators, parents and community health personnel.

The Teacher Training Model

The Curriculum, together with highly integrated kits of specially developed materials, including games and other "fun" activities, is of course directed at maximum learning for the children enrolled in the program. The importance of the teacher is not overlooked in bringing alive the materials component.

A companion teacher training model involves two weeks of in-depth training of teams of classroom teachers and administrators and leads to establishment of two successful classroom examples of each unit at its grade level in one school of a district. Each team of trainees, in addition to developing the unit in two classrooms, is required to work with its administrators to develop and conduct similar training for other teachers at their grade level within the first year. After establishment of a "success model" at the fifth grade level, succeeding waves of teachers are trained.

Since 1969, numerous teams of teachers and administrators have been trained in school districts from New York to California and the number of children exposed to the Curriculum has expanded accordingly.

In the elementary schools, children are generally associated with only one teacher for most of the instructional program. Therefore, SHCP training and experience inherently has a capability for modifying these teachers' behavior in teaching other subjects besides health education. Self-reports by teachers suggest that changes have occurred in teacher behavior, such as allowing more freedom of choice for tasks children might perform; permitting individual and group activity; and providing for open discussion of problems. The impact of change in teaching strategies has the potential for going well beyond SHCP to the teaching of all subjects and to the teaching of all children.

Community Involvement

The successful SHCP program includes a significant amount of community involvement, starting with parents and going well beyond to members of the health and medical professions, fire departments, industrial and business representatives, and private voluntary agencies. By their involvement, schools and communities enable the instruction to be better related to the real world of the students; and in the case of parents, the health education of children can influence the adults as well. Reports by teachers involved in the program often cite this kind of impact, seldom found in other instructional programs or modalities.

Purposes of the Evaluation Research

Notwithstanding the potential impact of participating in SHCP on a broad base of target groups, i.e., teaching behavior, school administration policies, parent behavior, and community group involvement, the purpose of this research study was narrowly defined to be a systematic, objective assessment of the long-range impact of the Curriculum of only one of these target groups, the students who were enrolled in it.

For purposes of this study, i.e., to measure student effects of the Curriculum, primary "impact" on students was defined as (a) effect on health knowledge about the body systems covered, and (b) effect on health-related behavior, that is, the students' own health practices in protecting the body from disease. Secondary "impact" on the student was explored in terms of (c) effect on attitudes related to cigarette smoking, (d) effect on smoking behavior, and (e) effect on school-related behavior, that is, motivation toward health and science interests and engaging in positive learning practices.

It is important for the reader to be reminded that the research was not directed at measurement of the total range of possible impacts beyond students, to teachers, school administrators, parents and relevant segments of the community at large. Other study limitations due to operational procedures and the realities of field research are described in Section S, Limitations and Conclusions.

2. IMPACT RESEARCH HYPOTHESES

Expectations regarding the potential long-range impact of SHCP were translated into impact hypotheses which could be tested by experimental means.

> Students enrolled in one or more units of the Curriculum will be statistically different after a time lapse of two to four years from students who were not enrolled:
>
> Primary impact expectations
>
> 1. They would be expected to possess more knowledge about the respiratory, circulatory and nervous systems.
> 2. They would be expected to engage in more acceptable health practices designed to protect their bodies from disease.
>
> Secondary impact expectations
>
> 3. They would be expected to hold more negative attitudes toward cigarette smoking and more positive attitudes toward non-smokers.
> 4. They would be expected to engage less in cigarette smoking behavior.
> 5. They would be expected to display more positive school-related behavior in terms of study habits, use of resources, and the like.

While the research was conducted in two phases, for the convenience of the reader the findings from both are combined in the following report.

3. RESEARCH DESIGN AND PROCEDURE

Overall Design

To test the foregoing five hypotheses, the research was conducted in two phases. Tests of Hypotheses 3 and 4 alone were conducted in Phase I. While this work proceeded, instruments needed to test Hypotheses 1, 2 and 5 were being constructed. All five hypotheses were then tested in Phase II.

The basic design was intended to employ eight treatment or Curriculum groups, defined by the type and number of Health Education Curriculum units a student had received:

Lung and Heart and Brain
Lung and Heart
Lung and Brain*
Heart and Brain
Lung only
Heart only
Brain only
No units

While it was recognized that a pre-post design for a longitudinal evaluation of impact of SHCP would have been desirable, practicality precluded this possibility. Students who were enrolled as fifth graders in the Lung Curriculum would by the time of this research be in the ninth grade, an intervening period of four years. To capture a similar time lapse, beginning with fifth graders in 1973 would require a delay until 1977 for obtaining comparable follow-up data. A retrospective evaluation plan was therefore settled upon. Fortunately, existing practices in use of SHCP by the schools permitted a design using a control group of students with similar characteristics enrolled in the same schools at the same times but not enrolled in the Curriculum.

---

* The discontinuous Lung and Brain, given in grades 5 and 7, was not represented in the final design.

Selection of school districts

As described in a report "Feasibility of Locating Subjects Who Have Had Units of the Elementary School Health Curriculum Project and of Administering the Teenage Self-Testing Kit to Them and Comparing Their Scores with National Norms" (Colmen, June 1973), a number of criteria were established for including districts in the research. These were:

- that the Curriculum had been operational in the district since 1969.
- that districts would be able to construct lists of students enrolled in each of the three units by year.
- that students still within the district could be located in the junior high or the secondary schools to which they had in most cases moved.
- that cooperation from school officials and parental consent, where necessary, could be obtained. (Appendix H)
- that a control group, matched as closely as possible with Curriculum enrollees was available.

Preliminary inquiries revealed that of seven districts in which the Curriculum was first implemented, two of the districts would not be able to participate because of extremely high student mobility out of their areas, which would seriously limit the number of Curriculum students available for follow-up.

To assure quality in sampling and administration of instruments, the remaining five districts, Bethlehem, Cajon Valley*, Kanawha, Los Altos, and West Genesee sent representatives to a one-day training session with staff of Education and Public Affairs and the Community Control Development Division in Washington, D.C. Among topics discussed were: methods of identifying potential students; sampling of students; assigning code numbers to each student; questionnaire administration methods; and local problems or situations requiring special handling.

One district, Los Altos, indicated its inability to furnish a control group from within its locale since almost all students had either been involved in the program or had recently moved into the district. Also, the Cajon Valley, Bethlehem and Kanawha County School Districts reported that almost no students had had all three units, primarily because junior high schools giving the nervous system unit in seventh grade did not receive students from schools where the fifth and sixth grade units had been taught.

---

* The Cajon Valley schools participated in the pre-tests. Unfortunately, due to events beyond their control, they were unable to continue their participation throughout the study.

Selection of student samples

The sample for Phase I consisted of current ninth graders who were in the fifth grade in 1969 when the first unit (Lung) was given; in the sixth grade in 1970 when the first Heart unit was initiated; and in the seventh grade in 1971, when the first Brain unit was introduced. The sample for Phase II included ninth, tenth, and eleventh graders; the Phase II tenth graders were the same students as the Phase I ninth graders and all eleventh graders were controls.

Students enrolled in any Curriculum combination were identified as "Experimental" students. Preliminary tallies of available students obtained from the participating districts disclosed that not every district had sufficient Curriculum enrollment in each of the experimental cells to sample in each one.* In the end, districts necessarily drew samples of students in only those categories with enrollment sufficient for research purposes. In every case, however an attempt was made to sample equal numbers of boys and girls.

Students were defined as "Controls" if they had never been enrolled in any of the three units. Initially, differences were projected between three types of possible Control subjects, based on the degree of exposure to or "contamination" by the Experimental group. In the first instance would be those students who had not themselves had the Curriculum units but had interacted with classmates at their own grade who were enrolled, or were taught in classrooms where Curriculum materials were conspicuously displayed. These students would, therefore, be designated as "High Exposure Controls", while those in schools where units were being given at grade levels other than their own would be designated as "Low Exposure Controls". Students from schools where Curriculum units were never present during their attendance, on the other hand, were designated as "No Exposure Controls". In actual fact, no district located a sufficiently large group of "Low Exposure" Controls. As for High Exposure Controls, only 21 were located, in the West Genesee Central schools. Where local controls are cited, therefore, the overwhelming majority are "No Exposure" Controls.

---

* Discrepancies between preliminary and final verified tallies were large, so that sampling designs had to be revised upon receipt of final tallies.

The final counts for Phases I and II are as follows:

Phase I

Experimentals	N
Lung-Heart-Brain	238
Lung-Heart	76
Heart-Brain	116
Lung	60
Heart	147
Brain	206
TOTAL	843*
Controls	
High Exposure	21
No Exposure	187
TOTAL	208*

---

* In experimental analyses the numbers were reduced to 815 Experimentals and 203 Controls due to missing data.

Phase II*

	Knowledge N	Health Behavior N	Attitude Factors N	Smoking Behavior N	School Related Behavior N
Experimentals					
Lung-Heart-Brain	181	391	0	165	383
Lung-Heart	176	204	171	167	194
Heart-Brain	146	239	0	131	234
Lung	130	128	130	121	125
Heart	112	122	118	114	118
Brain	180	236	0	175	234
Total	925	1320	419	873	1288
Controls	398	393	276	383	379

In addition to local Controls, a National sample of 800 ninth, 838 tenth and 845 eleventh graders was used as a quasi-control group in both phases. These comprised students, never exposed to the Curriculum, surveyed in 1973 to developing norms for subscales of the Teenage Self-Test.

Data collection instruments

Health Knowledge Test. Because the Curriculum content is specific, a new Health Knowledge Test was constructed. Psychometric methods employed are described in Appendix A. Appendix B is a copy of the test itself, used to collect data to test Hypothesis 1.

Health Behavior Inventory. Since existing health behavior measures were found not to measure behaviors related to the objectives stated by the Clearinghouse a new inventory was needed. Various formats of appropriate questions were designed and pre-tested with boys and girls in the ninth grade of two parochial schools in Silver Spring, Maryland. The responses of the students both to the questions and the formats were evaluated, particularly in terms of which was most likely to produce truthful, as opposed to "expected" responses. Revisions were made and the instrument used in the data collection to test Hypothesis 2. A copy of the Inventory appears as Appendix C.

---

* The Ns given here are the maximum available for analyses. Throughout the analyses presented later the Ns will vary from those given here due to differing amounts of missing data for each district, curriculum group and student sample.

- Teenage Self-Test: Smoking. To measure attitudes toward cigarette smoking, the Teenage Self-Test was employed.* The Teenage Self-Test is a self-administered and scored instrument measuring eight clusters of items related to the practice of cigarette smoking, developed from hundreds of interviews with teenagers and administered to a national probability sample of some 5,000 students in grades seven through twelve. Scores for eight clusters are derived from an experimental 83 item version as follows:

  - Health Concern, Costs
  - Non-smokers' rights
  - "Positive" Smoker Attributes
  - Direct Effects: "Benefits"
  - Negative Smoker Attributes
  - Parental Control, Authority
  - Destiny Control, Independence
  - Rationalization

---

*Developed by Education and Public Affairs, Washington, D.C. under contract with the National Clearinghouse for Smoking and Health, then under the Health Services and Mental Health Administration, HEW. (Appendix D)

A listing of the items in the eight scales of the experimental version of the Teenage Self-Test, used to test Hypothesis 3, appears as Appendix E.

- Smoking Behavior Classification. The experimental version of the Teenage Self-Test was supplemented with a number of demographic and behavioral items. Included among these were questions 77 and 78 dealing with past and present practices with respect to cigarettes from which a "Smoking Behavior" classification was derived. The smoking behavior classification was constructed as follows:

  Non-smoker: has smoked less than 100 cigarettes in the past and does not smoke now. (answered 1 or 2 to question 77; 2 to question 78)

  Smoker: has smoked in past and does smoke now. (answered 2 or 3 to question 77; 1 to question 78)

- School-Related Behavior Inventory. To measure elements of student behavior in the learning situation, as related to the Curriculum, a behavior inventory drawn around specific outcomes was required. No appropriate instrument was found in the literature. However, an extensive list of "critical incident" materials was available from the Clearinghouse. These incidents were behaviors reported by teachers who had used the Curriculum for a year, based on observation of their students. Asked to write descriptions of how students enrolled in the Curriculum were differentiated from all other students they had taught, the teachers displayed a fair amount of consensus as to what constituted critically differentiating behaviors. The assembled critical incidents served as a basis for the items in the School-Related Behavior Inventory. This instrument appears as Appendix C, and was used to test Hypothesis 5.

Data collection procedures

All data collection instruments were administered in classroom settings, during school hours. Except for one instance where scheduling difficulties appeared, all instruments were administered by members of the school districts' research or administrative staff. One or two class periods were consumed, depending upon the number of instruments being employed.

Confidentiality was preserved by means of a seven-digit identification code number which also served to classify questionnaires into appropriate data processing categories. The code consisted of: (1) phase of administration, spring or winter; (2) Curriculum (treatment), six Experimental and two Control; (3) district; and (4) individual student (four digits). Students were informed that no one with access to lists of names and identification numbers would also have access to questionnaires. Questionnaires were returned immediately to Education and Public Affairs for analysis, where they were edited, coded as necessary for key-punching, punched and then transferred to tape for statistical analysis against pre-designated instructions.

4. RESULTS

The five hypotheses in Section 2 were tested against selected dependent (criterion) variables:

- Health knowledge, as measured by a total score and three subtest scores of the Health Knowledge Test (See Appendix B). **
- Health behavior, as measured by the sum of item scores of the Health Behavior Inventory (See Appendix C). **
- Eight scale scores from the Teenage Self-Test: Smoking (See Appendix D).
- Smoking behavior from the Teenage Self-Test, items 77 and 78.
- School-related behavior, as measured by the sum of item scores on the School-Related Behavior Inventory (See Appendix C). **

Preliminary Analyses

Two preliminary analyses, of School District effect and of Grade effect,* were conducted in order to determine their use in testing the major experimental hypotheses.

---

*Appendix F, Tables 1 and 2, summarize all District and Grade analyses.

**Reliability coefficients are reported in Appendix I(Eye)

- District Analysis compared groups uncontaminated by differences in grade and in number of curriculum units taken to yield an estimate of the "clean" effects of district on the dependent variables.

In Phase I, t-tests revealed significant School District differences for only one out of ten dependent variables -- Scale 3 of the Teenage Smoking Kit where those enrolled in the Heart unit in Kanawha (N=92) scored significantly lower ($p < .01$) than those in the Heart unit in West Genesee (N=52).

Of the dependent variables measured in Phase II, only the four Knowledge Test Scores revealed significant differences between eleventh grade controls, with Kanawha scoring lower than Bethlehem ($p < .01$).*

By and large, then, School District effect was minimal. Nevertheless, where appropriate, these differences were taken into account in testing the major hypotheses either by analyzing districts separately or by using 2-way analysis of variance (Curriculum groups by District).

- Grade Analysis compared groups uncontaminated by differences between districts and in the number of curriculum units taken to yield an estimate of the "clean" effects of grade on the dependent variables.

---

*The District differences for the eight attitude scales were not re-tested in Phase II.

Of the 17 dependent variables tested in Phase II, three Attitude Scales and four Knowledge Test scores revealed significant Grade differences. For Scales #3 and #5, ninth graders scored significantly higher ($p < .05$) than eleventh graders. Eleventh graders scored significantly higher ($p < .05$) than ninth graders on Scale #7. Ninth graders expressed more positive reasons for smoking (Scale 3) and at the same time stronger negative attitudes about those who do smoke (Scale 5). As expected, eleventh graders reported feeling more independent and in control of their lives than ninth graders (Scale 7).

Tenth and eleventh graders, furthermore, scored significantly higher ($p < .01$) than ninth graders on all Knowledge Tests. This finding may derive from the fact that health knowledge may be covered in other school courses which may tend to reinforce early learning.

Because significant grade differences were found, grade was taken into account in testing the major hypotheses by analyzing grades separately or by using grade as a covariate.

Major Analyses

For each major hypothesis, analyses were conducted to take account of the effects of Level of Dosage and Treatment.

Level of Dosage Analysis tests the hypothesis that:

> students enrolled in successively more Curriculum units will be statistically different from those enrolled in fewer units. The assumption is made that addition of units has both a broadening effect in coverage related to cigarette smoking, such as Heart and Lung Units, and a reinforcing effect due to a common core repeated in all units.

Treatment Analysis tests the hypothesis that:

> the means of all students in one or more Curriculum units will be statistically different on the dependent variables from those who are not enrolled in any units.

Among the statistical approaches used were analysis of variance*, chi-square, and t-tests to compare Curriculum exposure groups, including Controls**; and correlation analysis when indicated to obtain the relationship between dependent variables and indices of increasing exposure to the Curriculum.

Hypothesis I -- Relationship of enrollment in Curriculum to later possession of health knowledge

Sample:

	Kanawha		Bethlehem	
EXPERIMENTALS	Grade 9	Grade 10	Grade 9	Grade 10
Lung-Heart-Brain	---	---	181	---
Lung-Heart	118	58	---	---
Heart-Brain	---	---	96	50
Lung	77	53	---	---
Heart	41	71	---	---
Brain	---	---	28	152
TOTAL	236	182	305	202
CONTROLS	218	58	43	79

---

* Where the F-value was significant at less than the .05 level, appropriate post-tests (Scheffe or Tukey) were computed.

** Throughout the analyses, Curriculum units not cited had not occurred, the numbers were too small to sample, or the final size was too small to use. West Genesee has been omitted from most analyses because of the paucity of their Control students.

Dependent Variable: One total score* and three subscores from the Health Knowledge Test.

Results: Separate analyses of variance and t-tests for each grade and district, followed by post-tests when appropriate, produced level of dosage and treatment results for Kanawha and Bethlehem. Table I summarizes significant differences between Curriculum and Control groups.

Table I

Significant Differences between Curriculum Exposure Groups, Including Controls

Curriculum Units Sampled		Health Knowledge Test Scores			
Kanawha	Grade	Total	Lung	Heart	Brain
Lung/Heart	9	.01	.01	.01	NS
	10	.01	.01	.01	NS
Lung only	9	.01	NS	NS	.01
	10	.01	.01	NS	.01
Heart only	9	NS	NS	NS	NS
	10	NS	NS	NS	NS
Bethlehem					
Lung/Heart/Brain	9	NS	NS	.01	NS
Heart/Brain	9	NS	NS	NS	NS
	10	NS	NS	.01	NS
Brain only	9	NS	NS	NS	NS
	10	NS	NS	NS	NS

NOTE: Values in Table I are F-Ratio Levels of Significance; NS means not significant at $p < .05$;
(Appendix F, Table 3, presents the actual Means and F-levels)

---

* To obtain total score on the Health Knowledge Test, each subtest score was standardized on the total group according to the formula: $z=(x-m)/s$ where m=mean of those having at least that unit and s=standard deviation of those having at least that unit. Then the three standardized subscores were summed to obtain the total score.

- Total Health Knowledge Score

  On the Health Knowledge Test total score, ninth and tenth grade Kanawha students enrolled in Lung/Heart and Lung only units scored significantly higher than Controls ($p < .01$). Kanawha students enrolled in Heart units scored higher than Controls but not significantly higher. In Bethlehem, ninth grade Lung/Heart/Brain students scored significantly higher than Brain students ($p < .01$) but not significantly higher than Controls. Students who had taken the Lung unit singly or in any combination seem to obtain higher scores than Controls on the Health Knowledge Test total score.

- Health Knowledge, Lung Score

  On the Lung Test, Kanawha ninth and tenth grade Lung/Heart students ($p < .01$) and tenth grade Lung students ($p < .01$) scored significantly higher than Controls. In Bethlehem, ninth grade Lung/Heart/Brain students scored significantly higher than Heart/Brain and Brain students. In both grades of the Kanawha school district, the direction of mean scores for Lung Knowledge increased from lowest for Controls on up to groups with Heart only, to Lung only, to Lung/Heart with the highest. Those who had taken the Lung unit or a combination including the Lung unit tended to score higher on the Lung test, as expected.

- Health Knowledge, Heart Score

  Heart Test scores for students enrolled in multiple units including Heart as one component, i.e., Lung/Heart, Lung/Heart/Brain, and Heart/Brain, were significantly higher ($p < .01$) than for Control group students in both grades of both districts, with the exception of the Heart/Brain group in Bethlehem's ninth grade. Students with only single Heart units failed to score significantly higher than Controls, but the mean differences were nevertheless in the expected direction.

- Health Knowledge, Brain Score

  Although Kanawha had no students enrolled in single or multiple Brain units, in both grades students with the Lung unit only scored significantly higher ($p < .01$) on the Brain Test than did Controls. In Bethlehem, although a significant F ($p < .01$) was found in ninth grade, post-tests failed to account for the internal location of those differences.

Correlation analysis supports the foregoing evidence in showing a significant relationship between Health Knowledge Test scores and two indices of increasing exposure to the Curriculum: Curriculum Exposure I, with four groups (Controls, single units, double units and triple units - values of 0,1,2 and 3) and Curriculum Exposure 2 with three groups (single units, double units, and triple units; excluding Controls - values of 1,2, and 3). Table 2* shows that all correlations except one are significant at $p < .05$ or better.

---

*Appendix F, Table 4 presents specific correlation coefficients.

Table 2

Significance Levels for Correlations between Health Knowledge Test Scores and Curriculum Exposure Indices.

	Curriculum Exposure 1		Curriculum Exposure 2	
	Grade 9	Grade 10	Grade 9	Grade 10
Total Score	.01	.01	.01	.05
Lung Score	.01	.01	.01	.05
Heart Score	.01	.01	.01	.01
Brain Score	.01	.05	.01	NS

NOTE: .01 means p .01 level of significance
.05 means $p < .05$ level of significance
NS means not significant at $p < .05$.

Students who had had three units tended to score higher than those who had had two units; two units higher than one; and one unit higher than Controls.

When all treatment groups were combined, thereby ignoring the number of units in which students were enrolled, differences between Experimentals and Controls washed out. Exceptions occurred on the Lung and Heart Tests where Kanawha ninth grade Experimentals scored significantly higher than Controls ($p < .01$) and on the Heart Test where Bethlehem ninth grade Experimentals scored significantly higher than Controls (p .05). All test means were, however, in the expected direction, i.e., Experimentals consistently scoring higher than Controls (See Appendix F, Table 5 for means).

Conclusions: In general, Knowledge Test scores relate appropriately to the kind and number of units taken. Students who have had the Lung unit alone or in combination with other units tend to score higher on both the total test and the Lung Test. On the Heart Test, students with combination units, but not students with the Heart unit only, scored significantly higher than Controls. This suggests the possibility, with Lung or Heart units, of a reinforcement effect of combination units. Results did not present a clear picture of the relationship between having had the Brain unit and scores on the Brain Test.

On the whole, evidence supports rejection of the null hypothesis that enrollment in Curriculum units is not related to possession of Health Knowledge. Rather, it appears that enrollment in Curriculum units, particularly Lung or combination Lung units, relates to higher scores on total Health Knowledge and on the specific Lung Knowledge Test; that enrollment in combination Heart units relates to higher Heart Test scores. There is also evidence to suggest that having taken more units or combination units, particularly those including Lung or Heart, has an enhancing effect on all Health Knowledge scores.

Hypothesis 2 -- Relationship of enrollment in Curriculum to later health-related behavior

Sample: Kanawha, Bethlehem and West Genesee - 9th and 10th grades

Experimentals	N
Lung-Heart-Brain	391
Lung-Heart	204
Heart-Brain	239
Lung	128
Heart	122
Brain	236
TOTAL	1,320
Controls	393

Dependent Variable: Total score on Health-Related Behavior Inventory (see Appendix C).

Results: In preliminary analyses, Health-Related Behavior scores for the various Curriculum exposure groups were not found to be affected either by grade or district. Therefore, all grades and districts were combined for analysis.

Using analysis of variance, the eight Curriculum exposure groups were compared, producing a significant F ($p < .05$). Post-tests, however, failed to reveal the location of these significant differences among groups. Means and Ns for the groups are presented below (Table 3).

Table 3

Health-Related Behavior Test Means for Curriculum Exposure Groups

Curriculum	N	Means
Lung/Heart/Brain	391	54.66
Lung/Heart	204	54.04
Heart/Brain	239	53.14
Lung	128	54.46
Heart	122	52.34
Brain	236	53.97
Controls	393	52.40

When Experimentals were compared with Controls, Kanawha and Bethlehem produced different results, as summarized in Table 4.

Table 4

Significant Differences between Experimental and Control Students on Health Behavior Inventory**

	Kanawha				Bethlehem			
	Grade 9		Grade 10		Grade 9		Grade 10	
	N	Means	N	Means	N	Means	N	Means
Experimentals	237	52.39	183	55.38*	300	54.92	201	53.94
Controls	215	51.56	57	51.70	41	52.93	80	54.90

$* = p < .05$

Only Kanawha tenth grade Experimentals scored significantly higher than Controls. However, Kanawha and Bethlehem ninth graders had means in the expected direction, i.e., Experimentals scoring higher than Controls. Inexplicably, Bethlehem tenth grade means for Controls and Experimentals were in a direction opposite to that found for Kanawha ninth and tenth graders and for their own ninth graders. As will become evident in other analyses, data for Bethlehem tenth grade was often different, i.e., in the opposite direction, from Bethlehem ninth grade and also the data for other districts; yet no logical explanation has been advanced to explain that difference.

Correlation data revealed a significant relationship between the two curriculum exposure indices and Health Behavior Inventory scores for ninth graders. Tenth grade data failed to corroborate this, perhaps again because of the unusual character of the scores of Bethlehem tenth graders.

Conclusions: The findings necessary to reject the null hypothesis, that Health-Related Behavior and Curriculum Exposure are not related,

---

** West Genesee has been eliminated because of lack of controls.

are mixed. Correlation analysis supports a relationship between Curriculum exposure and Health Behavior scores for the ninth grade, for example, but not for the tenth. Significance tests, on the other hand, show no statistically significant differences between various exposure groups and Health Behavior scores, except for the Kanawha tenth grade; even so, the Health Behavior scores of curriculum exposure groups are in almost all instances in the expected direction, i.e., higher than those of the Control groups.

Hypothesis 3 -- Relationship of enrollment in Curriculum to later attitudes toward smoking

Sample:

	Phase I - Grade 9	Phase II - Grades 9 and 10	
	Bethlehem, Kanawha, Los Altos, and West Genesee	Kanawha	West Genesee
Experimentals			
Lung-Heart-Brain	238	---	221
Lung-Heart	76	171	27
Heart-Brain	116	---	104
Lung	60	130	---
Heart	147	118	5
Brain	206	---	57
TOTAL	843	419	414
Controls	203	276	---
	National Norm	National Norm	
Controls	760	1,638	

Dependent Variable: Eight scale scores from the Teenage Self-Test: Smoking (Appendix D).

Results: A series of analyses was conducted to compare Curriculum exposure groups on the eight Teenage Self-Test scale scores.

- Comparison of Experimental Curriculum groups with national norm Controls

  In Phase I, an Automatic Interaction Detection analysis (Appendix G) led to the conclusion that there were no differences in four demographic variables between ninth graders in the National Norm and the Curriculum Study Control students. For this reason, it was concluded that the Experimental group could be compared with the National Norm group as a Control. When this was done, significant differences were found in favor of the Experimental group on Scales 1, 6, 7 and 8 ($p < .01$); and in favor of the "Control" or National group on Scale 3 ($p < .01$). Thus in Phase I, it appeared that exposure to the Curriculum did tend to affect positively a number of anti-smoking attitudes, when compared with a representative national group of ninth-graders.

  In Phase II, however, ninth grade data did not sustain this relationship of Curriculum exposure and attitudes, no differences being found between Experimentals and National Controls. Only Scale 4 favors the Experimental group in the tenth grade (the same subjects as Phase I ninth grade).

- Comparison of Experimental groups and their own Control groups

  In Phase I, except for Scale 8 ($p < .05$), significant differences in Teenage Self-Test scale scores in the appropriate direction were not found. Because the bulk of the Control subjects (182 out of 203) were from Kanawha, it was hypothesized that they might not have been representative of the Experimental subjects drawn from all four districts. The Treatment Effect hypothesis was retested using Kanawha students only, therefore ruling out possible geographical differences. The findings, however, were essentially unchanged.

In Phase II, almost as in Phase I, significant differences were not found, either for the ninth or tenth graders.

- Comparisons of level of exposure among Curriculum Study Control students, those who had been enrolled in only one unit, those with two units, and those with all three units.

In Phase I, Teenage Self-Test scale score differences in the appropriate direction between the various "level of dosage" groups were found in Scale 8, ($p < .05$). Again, because the Control group was so heavily drawn from Kanawha, the "level of dosage" hypothesis was tested for Kanawha alone. While there were no students in Kanawha with all three Curriculum units, a progression from Controls through a double unit was present, permitting this comparison to be made. The results for Kanawha paralled the results for the total group.

In Phase II, using analysis of variance techniques, the Curriculum exposure groups were compared with respect to attitude scale scores. Again, no significant differences were found.

Conclusions: Overall, the data do not support the hypothesis that Curriculum exposure in earlier years is related to positive (favoring non-smoker) attitude scale scores tested two to five years later. It may be recalled that effect on attitude toward cigarette smoking was a hoped-for, but secondary objective to be accomplished by the Curriculum. In studying

the actual content of the experimental School Health Curriculum Project, one finds that specific content directly on the subject of cigarette smoking per se is quite limited. Certainly the impression is there for the student to draw about its ill effects, but not in a highly overt way. This being the case, it may be too much to expect that enrollment in the Curriculum should have a stronger impact on attitudes toward smoking behavior than on attitudes toward any of a number of other individual health behaviors, such as diet, rest, exercise and the like. Furthermore, growing evidence that attitude changes are not always necessary steps on the road to behavior change, may give support to reducing the premium given to attitude modification with respect to cigarette smoking among adolescents. This view may have even more credence when one sees the section which follows on the effects of the Curriculum on later cigarette smoking behavior.

Hypothesis 4 -- Relationship of enrollment in Curriculum to later smoking behavior

Sample:

	Phase I - Grade 9 Bethlehem, Kanawha Los Altos, and West Genesee	Phase II - Grades 9 and 10 Kanawha and Bethlehem
Experimentals		
Lung-Heart-Brain	238	165
Lung-Heart	76	167
Heart-Brain	116	131
Lung	60	121
Heart	147	114
Brain	206	175
TOTAL	843	873
Controls	208	383
	National Norm	National Norm
Controls	760	1,638

Dependent Variable: A smoking behavior classification based on items 77 and 78 of the Teenage Self-Test.

Results: Significance of differences between percentages of smokers and non-smokers in the various Experimental and Control groups were calculated. (Table 5)

Table 5

Percentages of Smokers and Non-Smokers for Various Experimental and Control Groups

Phase I	N	% Smokers			% Non-Smokers
Ninth grade					
Study Experimentals	815	25.4			74.6
Study Controls	203	26.1	*	**	73.9
National Controls	760	32.2			67.8
Kanawha Experimentals	221	22.6			77.4
Kanawha Controls	182	25.8	*	**	74.2
National Controls	760	32.2			67.8
Phase II					
Ninth grade					
Study Experimentals	507	27.6	*		72.4
Study Controls	251	33.9		*	66.1
National Controls	800	32.3			67.7
Kanawha Experimentals	231	27.3			72.7
Kanawha Controls	210	32.9			67.1
National Controls	800	32.3			67.7
Tenth grade					
Study Experimentals	366	32.0			68.0
Study Controls	132	31.8			68.2
National Controls	838	32.7			67.3
Kanawha Experimentals	171	31.0			69.0
Kanawha Controls	55	40.0			60.0
National Controls	838	32.7			67.3

* $p < .05$
** $p < .01$

NOTE: Brackets indicate significant differences.

Dependent Variable: A smoking behavior classification based on items 77 and 78 of the Teenage Self-Test.

Results: Significance of differences between percentages of smokers and non-smokers in the various Experimental and Control groups were calculated. (Table 5)

Table 5

Percentages of Smokers and Non-Smokers for Various Experimental and Control Groups

Phase I	N	% Smokers		% Non-Smokers
Ninth grade				
Study Experimentals	815	25.4		74.6
Study Controls	203	26.1 *	**	73.9
National Controls	760	32.2		67.8
Kanawha Experimentals	221	22.6		77.4
Kanawha Controls	182	25.8 *	**	74.2
National Controls	760	32.2		67.8
Phase II				
Ninth grade				
Study Experimentals	507	27.6 *		72.4
Study Controls	251	33.9	*	66.1
National Controls	800	32.3		67.7
Kanawha Experimentals	231	27.3		72.7
Kanawha Controls	210	32.9		67.1
National Controls	800	32.3		67.7
Tenth grade				
Study Experimentals	366	32.0		68.0
Study Controls	132	31.8		68.2
National Controls	838	32.7		67.3
Kanawha Experimentals	171	31.0		69.0
Kanawha Controls	55	40.0		60.0
National Controls	838	32.7		67.3

* $p < .05$
** $p < .01$

NOTE: Brackets indicate significant differences.

the actual content of the experimental School Health Curriculum Project, one finds that specific content directly on the subject of cigarette smoking per se is quite limited. Certainly the impression is there for the student to draw about its ill effects, but not in a highly overt way. This being the case, it may be too much to expect that enrollment in the Curriculum should have a stronger impact on attitudes toward smoking behavior than on attitudes toward any of a number of other individual health behaviors, such as diet, rest, exercise and the like. Furthermore, growing evidence that attitude changes are not always necessary steps on the road to behavior change, may give support to reducing the premium given to attitude modification with respect to cigarette smoking among adolescents. This view may have even more credence when one sees the section which follows on the effects of the Curriculum on later cigarette smoking behavior.

Hypothesis 4 -- Relationship of enrollment in Curriculum to later smoking behavior

Sample:

	Phase I - Grade 9	Phase II - Grades 9 and 10
	Bethlehem, Kanawha Los Altos, and West Genesee	Kanawha and Bethlehem
Experimentals		
Lung-Heart-Brain	238	165
Lung-Heart	76	167
Heart-Brain	116	131
Lung	60	121
Heart	147	114
Brain	206	175
TOTAL	843	873
Controls	208	383
	National Norm	National Norm
Controls	760	1,638

In Phase I, significant differences in the proportion of cigarette smokers were not found between Curriculum Experimentals and study Controls. In Phase II, however, when all Experimentals and all study Controls were compared separately by Grade, fewer cigarette smokers ($p < .05$) were found among ninth grade Experimentals than among Controls. The same finding was not found in the tenth grade, however, again reflecting the possible different make-up of the Bethlehem tenth grade.

Percentages of smokers in Phase I and II ninth grade Study Controls may be seen to vary-- Phase I having a significantly lower percentage of smokers than Phase II. However, percentages of smokers in Study Experimental groups for the two phases were not statistically different. These differences would of course also contribute to the conflicting results, when comparing the Experimentals with Study Controls.

To counteract the inexplicable variation disclosed above, ninth grade Curriculum Study Experimentals for both Phases were compared with the National Control group, which of course was unchanged between Phases. In both Phases, results were consistent -- a lower percentage of smokers was found in the Experimental group than in the National Norm group (Phase I, $p < .01$; Phase II, $p < .05$).

Comparison of percentage of smokers in Kanawha alone paralleled the previous results in Phase I. In Phase II, although significant differences were not found, the results were consistently in the expected direction, i.e., a lower percentage of smokers in the Experimental than in the Control groups.

Conclusion: While not entirely conclusive, there is some support, particularly in the ninth grade, for rejection of the null hypothesis that Smoking Behavior and exposure to Curriculum are not related. From ninth grade data, it is seen that the Curriculum-enrolled Experimental groups contain fewer cigarette smokers than either Study or National controls. While similar differences are not found for the tenth grade, this may once again be due to the peculiar score reversals of Bethlehem's tenth grade data.

Hypothesis 5 -- Relationship of enrollment in Curriculum to later school-related behavior

Sample

Grades 9 and 10
Kanawha and Bethlehem

Experimentals	
Lung-Heart-Brain	383
Lung-Heart	194
Heart-Brain	234
Lung	125
Heart	118
Brain	234
TOTAL	1,288
Controls	379

Dependent Variable: Score on the School-Related Behavior Inventory.

Results: Preliminary analysis revealed that School-Related Behavior Inventory test scores were not affected by either grade or district.

In the principal data treatment, analysis of variance failed to reveal significant differences among the various Curriculum level of dosage groups. (Table 6)

Table 6

School-Related Behavior Test Scores for Various Curriculum Exposure Groups

Curriculum	N	Mean
Lung/Heart/Brain	383	76.87
Lung/Heart	194	76.79
Heart/Brain	234	79.80
Lung only	125	75.25
Heart only	118	77.70
Brain only	234	76.40
Controls	379	76.15

When differences in number of Curriculum units were ignored, comparing all Experimentals with all Controls, significant differences once again failed to emerge. As may be noted from Table 7, nevertheless, three of the four Experimental groups in the separate districts and separate grades scored higher, in the expected direction, though not statistically significantly, than Controls.

Table 7

Means and Significance of Differences for Experimental Compared with Control Students on the School-Related Behavior Inventory

	Kanawha				Bethlehem			
	9th Grade		10th Grade		9th Grade		10th Grade	
	N	Mean	N	Mean	N	Mean	N	Mean
Experimentals	225	78.35	179	74.02	293	76.46	203	75.83
Controls	204	76.92	55	73.35	42	78.38	78	74.92

Conclusion: Evidence is insufficient to reject the null hypothesis that there is no relationship exposure to Curriculum and school-related behavior.

Additional Analyses

Interrelations among dependent variables

The various dependent variables used as outcome indicators in the study were found themselves to be highly interrelated. (Table 8)

Table 8

Significant Product Moment Correlations ($p < .01$) Among Dependent Variables

	Health Behavior	Health Knowledge	Smoking Attitudes (8 Scales)	School Behavior	Smoking Behavior
Health Behavior		✓	(8)*✓	✓	✓
Health Knowledge			(5) ✓	✓	✓
Smoking Attitudes (8 Scales)				(7)✓	(8)✓
School Behavior					✓
Smoking Behavior					

* Numbers in parentheses indicate number of scales with significant correlations.

The correlations between the dependent variables suggest a complex of knowledge, attitude and behaviors that characterize teenage non-smokers and differentiate them from teenage smokers. Teenage non-smokers tend to have higher Health Behavior scores, higher Health

Knowledge Test scores, attitudes more in keeping with non-smokers, and higher School Behavior scores than smokers.

Conclusion: Because of the high interrelationships among the foregoing variables, it would appear that smoking behavior among teenagers may lend itself to change by a variety of means of intervention, so that transmission of knowledge may be accompanied by or associated with changes in attitude and behavior. Since educational programs generally have utility in these areas, considerable support would appear for continuing such efforts as the School Health Curriculum Project as one possible way of reducing cigarette smoking among adolescents.

Relationship of Reported Parents' Smoking and Peers' Smoking to Teenagers' Smoking Behavior

Table 9 summarizes findings concerning the relationship between teenagers' smoking behavior and that of their parents and peers.

Table 9

Comparative Relationships of Reported Parents' Smoking and Peers' Smoking with Self Smoking and Other Variables *

	4 Best Friends Smoke	Parents Smoke
Smoking Behavior	.67	.16
Health Behavior	.30	.08
Health Knowledge	.25	.16
School Behavior	.36	.11

* Entries are product-moment correlations, all significant at $p < .01$.

Conclusion: While correlations between dependent variables and peer or parents' smoking behavior are both statistically significant, as may be seen from the consistently higher magnitude of the correlations obtained with peer behavior, youngsters are more likely to be influenced by whether or not their friends smoke than by whether or not their parents smoke.

5. LIMITATIONS AND CONCLUSIONS

Limitations

Before presenting a summar of conclusions reached, the reader should be aware of the limitations imposed on the evaluation research, essentially all arising from the pragmatic problems inherent in field research.

- Attrition in expected participation of all five of the original school districts led finally to elimination of two California school districts, and left an even more trumcated group of samples from which to generalize about the Curriculum, i.e., one in West Virginia and two in upstate New York.

- Inordinate delay in Phase II in gaining CDC, HEW and OMB clearances for the measuring instruments led to approvals so late in the spring semester that some schools dropped out and others administered an abbreviated version of the Battery. While every effort was made to stabalize sampling, so that the reduced number was representative of the total, there is some evidence that the Phase II sample differs from Phase I. The frequent "on-again, off-again" expectations to proceed leveled upon the school systems over an eight month period necessarily led to resentment that diminished to an unknown degree the extent of their final involvement. Its effect on the sample of Behtlehem tenth graders which seemed to be uniquely different from other schools and even from its own ninth graders, is not entirely to be dismissed.

- The evaluation study designed for reasons given earlier, was not a true longitudinal design. Under the desire for evaluation results within a short time frame, no baseline measure could be obtained. It is not possible to say, therefore, the degree to which Experimental and Control groups changed comparatively over time.

In addition to recognizing the foregoing practical difficulties which affected the research, the reader is once again cautioned to remember that the results reported represent impact on students only, and do not speak to possible benefits, suggested in less systematic observations on teacher performance, school administrator policy making, parent behavior and community agencies. Thus this report addresses only one portion of the program, the results of which should not be generalized to its effects on the target groups.

Furthermore, children grow up under many different influences, in which family, friends, peers, media, church and schools play various parts in the child's development. Even within the school, children are exposed to numerous other curricula and teaching styles. The extent to which enrollment in SHCP alone can be expected to produce the kinds of student impact desired must be realistic. Two to five years later, the effect of SHCP may be present, but so muted by the wealth of other experiences to which the child has been exposed, that a statistically significant finding of durable impact may be too much to expect.

Conclusions

Hypothesis I: Health Knowledge test scores obtained two to five years later do relate to the kind and number of Curriculum units taken - the greater the Curriculum exposure, the higher the score on the Health Knowledge Test. Later knowledge, by and large, also is specifically related to the Curriculum unit or units in which the student was originally enrolled.

Hypothesis 2: In assessing the effect of enrollment in the Curriculum on reported health behavior two to five years later, a significant relationship was found between Curriculum exposure and Health Behavior Inventory scores for the ninth grade, but not for the tenth. In spite of the fact that significance tests showed few statistically significant differences between Experimental and Control groups, the differences most often were in the expected direction, i.e., Experimentals scoring higher than Controls. The consistency of direction suggests that another study, less affected by field operational problems and their possible impact on sampling, might support a finding of concordance between curriculum enrollment and health behavior.

Hypothesis 3: Attitudes as measured by the eight scales of the Teenage Self-Test failed to differ on the basis of whether students were or were not enrolled two to five years earlier in the Curriculum.

Hypothesis 4: In assessing the effect of enrollment in the Curriculum on reported smoking behavior two to five years later, smoking behavior was found to be significantly related to exposure to the Curriculum for ninth graders, with fewer cigarette smokers as expected in the Experimental than in the Control groups, but not for tenth graders. Phase II, nonetheless, while producing results not achieving statistical significance, does show consistency in the direction of relationships, with a lower proportion of cigarette smokers in Experimental than in Control groups. Once again, it is possible that another study, less distrubed by field operating difficulties and their impact on sampling, might produce results that meet statistical as well as rational tests of significance.

Hypothesis 5: School-related behavior as measured by self reports on the School-Related Behavior Inventory two to five years later failed to vary on the basis of whether a student had or had not been enrolled earlier in the Curriculum. It may have been that the elements measured in the School-Related Behavior Inventory were simply not sufficiently sensitive to the Curriculum. In more subsequent research, it might be useful to obtain such objective measures as school attendance or elevation of reading levels on a standardized reading test as measures of school impact. At least one school district reports obtaining promising findings in upgrading of student reading levels accompanying enrollment in the Curriculum.

Interrelationships of the dependent variables suggest that, by changing knowledge, changes in attitudes, health behavior and smoking behavior may also be affected; or that by changing any one or two, the remaining ones are likely to change as well. If this is so, intervention efforts directed toward inducing positive behavior to protect one's body systems should benefit from the kinds of education efforts represented by the School Health Curriculum Project. To the extent the Curriculum may be fashioned more directly to impact on behavior and attitude formation, its present benefits may be expected to be even further enhanced.

In the view of the research team, given the operating limitations imposed on the study and a realistic set of expectations of impact, the findings for SHCP are encouraging. They would speak for continuation of the effort, with time taken for an in-depth internal review, searching for ways in which a foundation for the types of specific attitude and behavior change could best be laid by modification or supplementation of content or methodology.

APPENDIX A

Development of the Health Knowledge Test

Development of the Health Knowledge Test

Writing the Pretest

As a first step in devising a test of health knowledge, much of the literature appropriate to the area was searched. This included:

- tests written by editors of biology textbooks for adolescents
- item pools constructed by research groups for use with various adolescent age groups
- tests designed by researchers for use in related studies (including a knowledge of cigarette smoking.)
- tests designed specifically to evaluate ESHEC, either at the local school level or in broader-scope studies.

Secondly, a classification of the goals and broad subject areas intended to be covered by the curriculum was established. These comprised two levels:

- a broad classification common to all three units, covering structure of various systems, function, causes of disease, and prevention of disease.
- content specific to each unit: for example, cigarette smoking, pollution, etc., in the respiratory unit; nutrition, etc., in the circulatory unit; drugs, etc., in the nervous system.

With this background in hand, items were drafted. Using the classifications listed above, items were written for each of the three areas -- lung, heart and brain. Three general types of items were written:

- four-choice multiple choice items
- multiple-choice items referring to diagrams of, respectively, the respiratory apparatus, the heart, and nerve cells
- matching items

On completion, the items were submitted for review to two physicians to ~~i~~ensure the accuracy of content, and to people familiar with the curriculum to assure relevance. Item stems or responses were re-written where necessary, and wording was revised in certain cases to improve clarity and reduce ambiguity.

These efforts produced three separate tests -- a lung test of 48 items, a heart test of 46 items, and a brain test of 53 items. In addition one systems matching set, common to all three curriculum units, was constructed with 10 items.

Administration of the Pretest

It was decided that the three tests should be pretested on an "experimental" and a "control" group -- the experimental group composed of those students who had the units in the past, and the control group of those students who had not had the units. The control group would not be used to determine discrimination indices for the items, but simply to determine the extent to which the information embodied in the test was available in the general milieu of adolescents.

The pretest students were chosen from ninth-graders in two school districts, El Cajon and Los Altos, both in California. These districts were chosen because the other three of the original five districts (Kanawha, Bethlehem and West Genesee) would take part in final data collection in Phase II, and no students could be spared for pretest. It was felt that the range of abilities present in Los Altos and El Cajon would fairly represent the available range in the three primary test districts where the final test would be used.

Distributions of responses to the three tests were analyzed separately by test, by district, and by experimental or control group. (See Table A-1)* From inspection, certain findings emerge:

- The tests were all somewhat difficult, the lung test being the easiest and the brain the hardest.
- The experimental groups in all cases scored better than the control groups.
- There were essentially no differences between the experimental groups from the two districts.

Due to the last finding the experimental groups only from both districts were combined to determine discrimination indices and difficulty levels for each item. Each test was analyzed separately. The criterion in these analyses was an internal one, i.e., the total score on each test. The criterion group was divided into quartiles and the discrimination index plotted against this four-way breakdown. Each item was examined with respect to difficulty level, significance of discrimination index, and functioning of each distracter.

Ideal item difficulties of selected items should cluster around that point which discriminates maximally between experimental and control groups. In practice, sufficient items are seldom available at this point, and this was true in the current study. However, a satisfactory spread of item difficulties was obtained.

Items were chosen with difficulty levels between .30 and .80, where indices of discrimination were significant beyond $p < .05$, and distracters which were not functioning were changed. This was done sparingly, however, as the effect of changing a distracter may be to change the other parameters to some unknown degree.

---

* The possible range, or total score on each test reflects the fact that the 10-item systems-matching question was added to each test.

Ideally, each of the three texts would be administered to students who had had only that unit. However, sufficient numbers of such students were not available to permit that plan to be employed. In Los Altos all students had all three units; moreover, no controls were available. In El Cajon, while there was a sizeable group who had been enrolled in only the brain unit, the rest of the experimentals had been enrolled in both lung and heart units. Therefore, with the exception of the brain test in El Cajon, each test was given to students who had had the appropriate unit plus one or two other units.

Each student took only one of the three tests. In most cases students finished within 30 minutes.

The tests were administered in small group sessions by local personnel under guidelines established by Education and Public Affairs. All responses were confidential, the test papers being identified only by district, by the number of the test (1, 2 or 3 -- test names were not used), and by whether the respondent was an experimental or control subject.

Subjects were told that their responses would be confidential, that their results would be used to determine which items would be used in a later experiment, and that guessing was allowed. Very few items were found to be omitted.

Item Analysis

The basic purpose of the following analyses was to select items for the final test (or alternatively, to eliminate non-functioning items.)

By this process, a total of 90 items was selected from the original 157, to be used in the final test. In terms of the classifications derived for item writing the final selected items were distributed as follows:

Lung Test

Structure	7
Function	7
Disease	7
External	2
Diagram	5

Heart Test

Structure	5
Function	4
Disease	7
Nutrition	1
Diagram	5
Matching	7

Brain Test

Structure	4
Function	6
Disease	5
Drug	5
Diagram	4

Systems matching	10

Within each of the three tests the items were randomized according to classification and to difficulty level. The three tests were then arranged to follow each other (without titles or breaks) in the order of lung, heart, brain, and systems matching.

Table A-1

Test Score Distributions
(Experimental Health Knowledge)

Test 1 -- Lung

	N	Mean	SD	Possible Range	Range
All Experimentals	102	31.20	8.70	0-58	7-49
Los Altos Experimentals	71	30.94	9.38	0-58	7-49
Cajon Experimentals	31	31.77	6.99	0-58	18-45
Cajon Controls	18	23.50	6.33	0-58	16-41
Test 2 -- Heart					
All Experimentals	96	25.42	8.95	0-56	9-47
Los Altos Experimentals	71	26.51	9.14	0-56	10-47
Cajon Experimentals	25	22.32	7.76	0-56	9-36
Cajon Controls	30	17.27	5.94	0-56	6-29
Test 3 -- Brain					
All Experimentals	133	24.68	9.17	0-63	7-46
Los Altos Experimentals	49	24.14	9.33	0-63	7-46
Cajon Experimentals	84	25.00	9.11	0-63	9-44
Cajon Controls	86	22.26	7.32	0-63	11-37

APPENDIX B

Knowledge Test

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Public Health Service
Center for Disease Control
Bureau of Health Education
Atlanta, Georgia 30333

OMB NO. 68S75038
APPROVAL EXPIRES June 1976

Place code No. here.

Knowledge Test

Please read all choices for a question before answering. Then circle the number beside the answer which best answers the question. Circle only one answer per question. If you don't know the answer, make the best guess at it. Work rapidly, but as carefully as you can.

1. Air exhaled and forced through which organ makes the sound of the human voice?
    1. pharynx
    2. larynx
    3. bronchial tube
    4. trachea

2. The diaphragm separates the:
    1. chest cavity from the abdominal cavity
    2. heart from the lungs
    3. trachea from the esophagus
    4. rib cage from the chest cavity

3. The most important way in which cancer cells differ from normal cells is that they:
    1. require different nutrients
    2. generate less heat in metabolism
    3. divide more rapidly
    4. carry fewer chromosomes

4. The rate of breathing is controlled by the:
    1. heart
    2. metabolism
    3. brain
    4. muscles

5. The pharynx is the:
    1. throat cavity
    2. voice box
    3. nasal cavity
    4. sinus cavity

6. A colorless, odorless and poisonous gas that comes out of automobile exhausts is called:
    1. carbon dioxide
    2. sulfur dioxide
    3. carbon monoxide
    4. hydrogen sulfide

Please continue on to the next page

7. When someone disturbs the balance of blood gases by breathing too fast, it is called:
   1. anoxia
   2. asphyxia
   3. hyperesthesia
   4. hypervantilation

8. The major part of the breathing motion is started by the:
   1. heart
   2. diaphragm
   3. rib cage
   4. lungs

9. From the pharynx the air breathed in goes to the:
   1. villi
   2. bronchi
   3. alveoli
   4. trachea

10. The most prevalent cause of death in the U.S. is:
    1. heart disease
    2. cancer
    3. accidents
    4. poisoning

11. Oxygen diffuses into the blood stream through the walls of the:
    1. trachea
    2. bronchi
    3. bronchioles
    4. alveoli

12. Alveoli are:
    1. finger-like projections in the small intestine
    2. tiny living hairs in the air passages
    3. air sacs in the lungs
    4. granules within the nuclei of blood cells

13. The function of the alveoli is to:
    1. allow blood to give up carbon dioxide and take on oxygen
    2. sweep dust and other unwanted materials up and out of the air passages
    3. absorb digested food into the blood stream
    4. keep food from going down the windpipe

14. An unmistakable symptom of inflammation of the pleural cavity is:
    1. sore throat
    2. painful breathing
    3. dry cough
    4. nasal congestion

Please continue on to the next page

15. Air is composed mainly of:
    1. nitrogen
    2. carbon dioxide
    3. oxygen
    4. carbon monoxide

16. Capillaries are blood vessels in which:
    1. blood flows with the greatest pressure
    2. blood flows only toward the heart
    3. blood flows only away from the heart
    4. the exchange of gases takes place in tissues

17. The principal symptom of emphysema is:
    1. shortness of breath
    2. painful breathing
    3. coughing up blood-tinged sputum
    4. nasal congestion

18. The function of cilia is to:
    1. keep food from going down the windpipe
    2. sweep dust and other unwanted materials from the air passages
    3. aid in the absorption of food
    4. allow for the exchange of oxygen and carbon dioxide between air and the blood

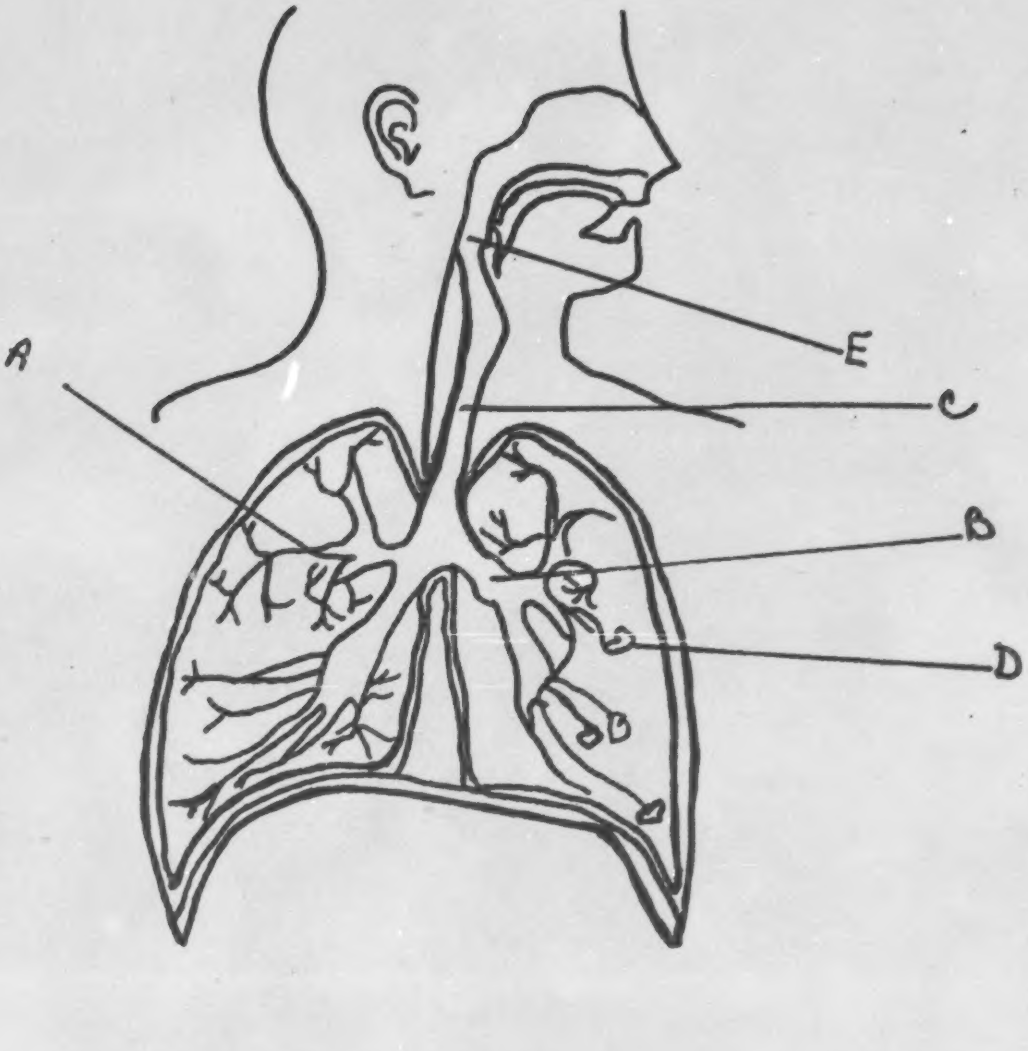
19. The larynx is commonly known as the:
    1. windpipe
    2. nasal cavity
    3. voice box
    4. throat

20. Blood with the least oxygen will be found in blood vessels:
    1. in the intestines
    2. going to the lungs
    3. in the legs
    4. coming from the lungs

21. Emphysema is most often associated with:
    1. lung cancer
    2. asthma
    3. glue sniffing
    4. cigarette smoking

Please continue on to the next page

22. Surrounding the alveoli are tiny:
    1. air sacs
    2. blood vessels
    3. bronchioles
    4. filters



Please continue on to the next page

The five questions below refer to the diagram on page 4.

23. The alveolus is labeled:
    1. A
    2. B
    3. C
    4. D

24. The bronchiole is labeled:
    1. A
    2. B
    3. C
    4. D

25. The bronchus is labeled:
    1. A
    2. B
    3. C
    4. D

26. The pharynx is labeled:
    1. A
    2. B
    3. C
    4. E

27. The trachea is labeled:
    1. B
    2. C
    3. D
    4. E

28. Which part of the blood carries most of its oxygen?
    1. red blood cells
    2. white blood cells
    3. platelets
    4. plasma

29. A heart murmur usually means that:
    1. the ventricles are not completely full of blood
    2. blood is leaking through a heart valve or another opening in the heart
    3. the right ventricle contraction is weaker than the left ventricle contraction
    4. air leaks from the left lung near the heart

Please continue on to the next page

30. The blood vessels where the tissues and organs actually receive their oxygen are called:
    1. veins
    2. arteries
    3. capillaries
    4. alveoli

31. Atherosclerosis can occur:
    1. only in the heart
    2. any place in the body
    3. only in the brain
    4. any place where there are blood clots

32. Channels that carry blood away from the heart are called:
    1. veins
    2. vena cavae
    3. capillaries
    4. arteries

33. The foods which we should watch most carefully to prevent atherosclerosis are:
    1. vegetable oils
    2. animal fats
    3. proteins
    4. sugars

34. A patient with an enormous white blood-cell count and many immature white corpuscles is probably a victim of:
    1. pernicious anemia
    2. iron-deficiency anemia
    3. hemophilia
    4. leukemia

35. The heart sounds are produced by the:
    1. coronary artery
    2. heart chambers
    3. heart valves
    4. heart muscle

36. Which organ controls heart rate?
    1. brain
    2. lungs
    3. kidneys
    4. pituitary

37. The presence of fatty deposits inside the arteries is called:
    1. atherosclerosis
    2. multiple sclerosis
    3. diverticulosis
    4. cirrhosis

Please continue on to the next page

38. When the blood pressure is taken, it measures the pressure of the blood in the:
    1. heart
    2. veins
    3. capillaries
    4. arteries

39. A blood clot or hemorrhage in an artery of the brain is called:
    1. encephalitis
    2. hypertension
    3. stroke
    4. arteriosclerosis

40. In pulmonary circulation the flow of blood is from the:
    1. lungs to the rest of the body and back to the lungs
    2. heart to the lungs and back to the heart
    3. heart to all parts of the body except the lungs and back to the heart
    4. lungs to the heart and back to the lungs

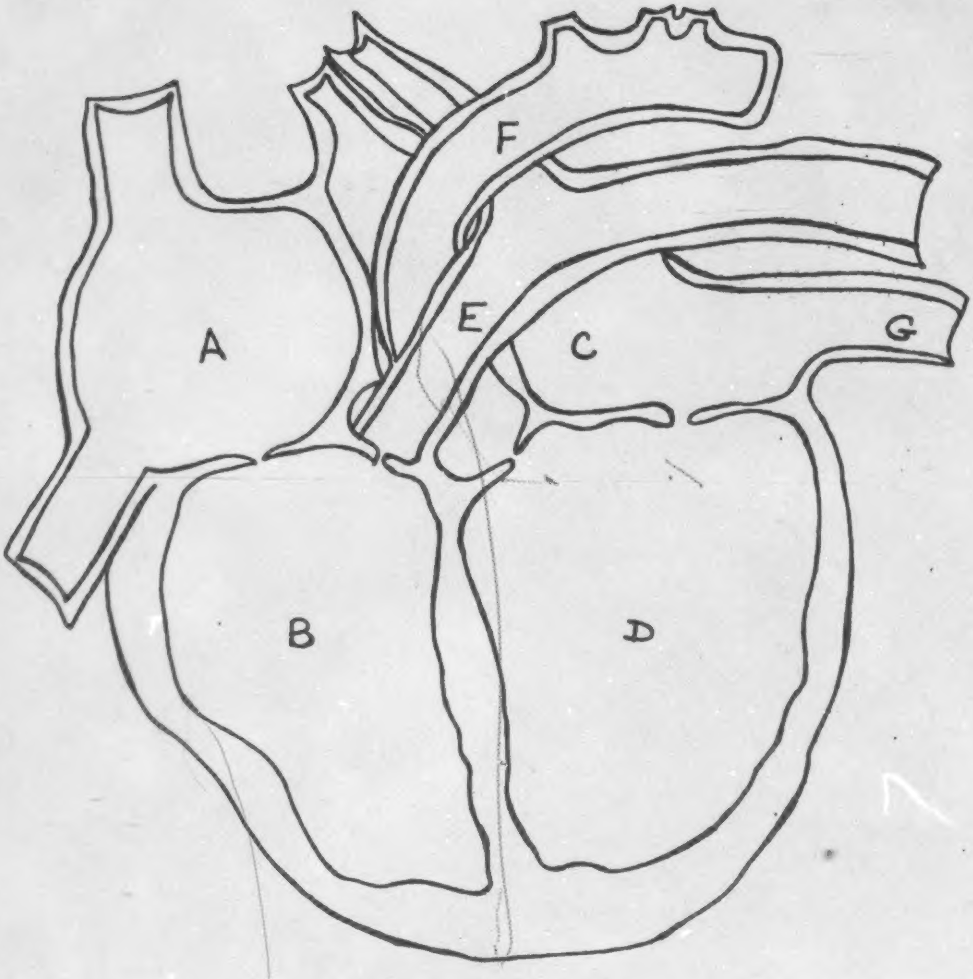
41. Coronary heart disease is a condition which begins in the:
    1. arteries in the heart
    2. veins in the heart
    3. muscles in the heart
    4. valves in the heart

42. The heart is divided in the middle by:
    1. the endocardium
    2. the aorta
    3. the septum
    4. the pericardium

43. Phlebitis is accompanied by a clot in:
    1. an artery
    2. a vein
    3. a capillary
    4. a heart chamber

44. White blood cells are vital because they:
    1. destroy bacteria
    2. carry oxygen
    3. carry food
    4. destroy tissue wastes

Please continue on to next page


F
E
A
C
G
B
D

The next five questions refer to the diagram on page 8.

45. The pulmonary vein is labeled:
    1. C
    2. E
    3. F
    4. G

46. The chamber which receives oxygenated blood from the lungs is labeled:
    1. A
    2. B
    3. C
    4. D

47. The vessel through which blood passes from the heart out to the rest of the body (except the lungs) is labeled:
    1. C
    2. E
    3. F
    4. G

48. The vessel through which blood goes to lungs for oxygen is labeled:
    1. C
    2. E
    3. F
    4. G

49. The chamber that pumps blood to the body (except for the lungs) is labeled:
    1. A
    2. B
    3. C
    4. D

For each definition in the right column, find the word in the left column which best matches it. Print the letter of that word in the blank space provided. PRINT NEATLY.

A. Diastolic
B. Hemoglobin
C. Hemophilia
D. Leukemia
E. Myocardium
F. Plasma
G. Rh factor
H. Systemic
I. Systolic

___ 50. Lowest blood pressure in an artery
___ 51. The liquid portion of the blood
___ 52. "Bleeder's disease"
___ 53. Muscular heart wall
___ 54. A disease in which a great excess of white corpuscles is formed
___ 55. The substance which makes blood red
___ 56. The principal circulation of blood throughout the body

Please continue on to the next page

57. The three main parts of the brain are the:
    1. frontal lobes, dendrites, and synapse
    2. medulla, cerebellum, and cerebrum
    3. medulla, cerebellum, and sensory area
    4. occipital lobes, cerebellum, and cerebrum

58. The stimulant drug often contained in "pep pills" is:
    1. cocaine
    2. nicotine
    3. phenobarbital
    4. benzedrine

59. The autonomic nervous system controls:
    1. higher mental processes
    2. involuntary actions of organs
    3. complex motor activity
    4. spinal reflexes

60. Myelinated nerve fibers may be destroyed in any part of the central nervous system in:
    1. multiple sclerosis
    2. shingles
    3. encephalitis
    4. muscular dystrophy

61. A dangerous drug, the possession or use of which is prohibited even to the medical profession, is:
    1. demerol
    2. morphine
    3. heroin
    4. cocaine

62. The most important factor in stroke prevention is:
    1. avoiding sudden changes in altitude
    2. maintaining good nutrition
    3. avoiding high blood pressure
    4. avoiding stress

63. The flexibility of the lens in a human eye is important in:
    1. protecting the pupil from possible injury
    2. focusing both near and distant objects
    3. determining speed of nerve impulses to the optic nerve
    4. controlling the amount of light striking the retina

64. The cerebral cortex is divided into four areas, called:
    1. hemispheres
    2. sulci
    3. gyri
    4. lobes

Please continue on to the next page

65. Marijuana is:
    1. an intoxicating drug made from the Indian hemp plant
    2. the most addicting of the opiate drugs
    3. a dried leaf chewed for its stimulating properties
    4. a poisonous substance in tobacco leaves

66. In general, the motor area in the left hemisphere of the brain controls movement:
    1. on the left side of the body
    2. on both sides of the body
    3. in the lower part of the body
    4. on the right side of the body

67. "Senility" - the mental changes associated with old age in some people - is most often caused by:
    1. arteriosclerosis
    2. cerebral palsy
    3. meningitis
    4. brain tumor

68. If you were swimming in the ocean and suddenly saw a shark, the most important hormone your body would secrete to help you swim faster is called:
    1. pituitin
    2. adrenalin
    3. thyroxin
    4. testosterone

69. Which of the following conditions results in destruction of brain cells?
    1. complications of hepatitis
    2. iron deficiency anemia
    3. functional schizophrenia
    4. long-term abuse of alcohol

70. The nervous system acts with what else to produce strong feelings or emotions?
    1. certain glands
    2. sensory organs
    3. certain muscles
    4. the heart

71. Morphine is:
    1. a stimulant drug found in "pep pills"
    2. an intoxicating drug made from the Indian hemp plant
    3. a synthetic drug produced from coal tar, used to induce sleep
    4. an opium derivative used to kill pain

Please continue on to the next page

72. The brief rest that nerve cells need between transmission of messages is called the:
    1. reflex arc
    2. impulse
    3. refractory period
    4. motor pause

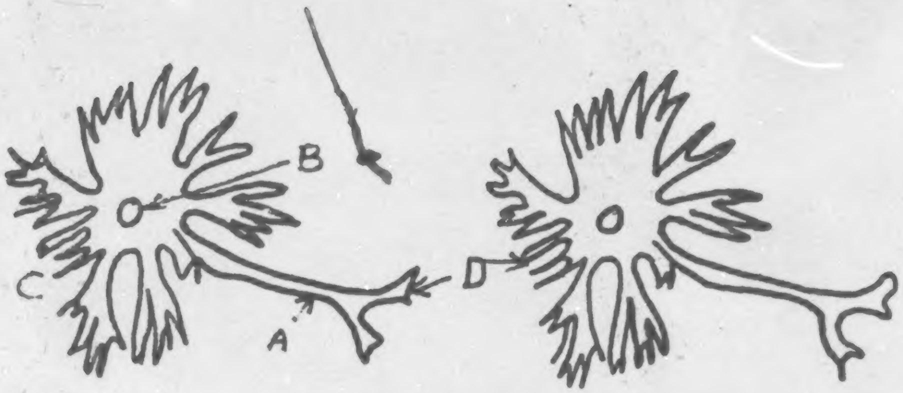
73. When you react to a mosquito on your arm by brushing it off, in what order do the neurons fire:
    1. sensory, association, motor
    2. motor, sensory, association
    3. motor, association, sensory
    4. sensory, motor, association

74. A venereal disease which ultimately results in serious psycho-motor disturbances is:
    1. gonorrhea
    2. cirrhosis
    3. syphilis
    4. urethritis

75. Opium is:
    1. the most addicting of the psychedelic drugs
    2. a natural narcotic from which other drugs are made
    3. a salt with a sedative effect
    4. a synthetic relative of cocaine, widely used in medicine

76. In humans, sensory nerves carry nerve impulses from:
    1. receptors to the central nervous system
    2. the central nervous system to receptors
    3. effectors to the central nervous system
    4. the central nervous system to effectors

Please continue on to the next page



77. The axon is labeled:
    1. A
    2. B
    3. C
    4. D

78. The synapse is labeled:
    1. A
    2. B
    3. C
    4. D

79. The dendrites are labeled:
    1. A
    2. B
    3. C
    4. D

80. The nucleus is labeled:
    1. A
    2. B
    3. C
    4. D

Please continue on to the next page

For each definition in the right column, find the organ system in the left column which best matches it. Print the letter of that word in the blank space provided. PRINT NEATLY.

A. Circulatory
B. Digestive
C. Endocrine
D. Excretory
E. Integumentary
F. Muscular
G. Nervous
H. Reproductive
I. Respiratory
J. Skeletal

___ 81. Nasal passages, trachea, bronchi, lungs
___ 82. Ductless glands
___ 83. Brain, spinal cord, nerves, and sense organs
___ 84. Bones, cartilaginous structures, and ligaments of the body framework
___ 85. Heart, blood and lymph vessels, spleen
___ 86. Mouth and associated structures, esophagus, stomach, small intestine, large intestine (colon), pancreas, liver
___ 87. Skin, hair, nails
___ 88. Ovaries, testes, and associated organs
___ 89. Skeletal, smooth, and cardiac muscles
___ 90. Kidneys, ureters, urinary bladder, urethra, other organs with partial similar function, including lungs, skin, liver, and large intestine

You are now finished with the test. Thank you.

APPENDIX C

School-Related Questionnaire

Health-Related Questionnaire

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Public Health Service
Center for Disease Control
Bureau of Health Education
Atlanta, Georgia 30333

OMB NO. 68S75038
APPROVAL EXPIRES June 1976

Place Code No. here.

PART I

School Related Questionnaire

INSTRUCTIONS:

Below is a list of different behaviors related to things students do in school. In comparison with most people your age, how would you say you stand on each of the items? After reading each item, circle the number at the right that most nearly shows your behavior. For example, if you think you do something much more often than most people your age, circle the ① in the column labeled "Much more than most." If you think you do something somewhat less than most people your age, circle the number ④ in the column labeled "Somewhat less than most."

Read each statement carefully before giving your answer. Please answer every item.

	1. Much more than most	2. Somewhat more than most	3. About the same as most	4. Somewhat less than most	5. Much less than most
1. Use the public library to get more information on some special topic.	1	2	3	4	5
2. Read books on health subjects or science.	1	2	3	4	5
3. Use the school library to get more information on some special topic.	1	2	3	4	5
4. Complete homework assignments on time.	1	2	3	4	5
5. Participate in classroom discussions.	1	2	3	4	5
6. Participate in classroom projects.	1	2	3	4	5
7. Work on projects with other students as a member of a group.	1	2	3	4	5
8. Am interested in a career in a health field or science.	1	2	3	4	5

Please continue on to next page.

	1. Much more than most	2. Somewhat more than most	3. About the same as most	4. Somewhat less than most	5. Much less than most
9. Work independently on school projects.	1	2	3	4	5
10. Ask questions of a teacher when not clear about a subject.	1	2	3	4	5
11. Talk to experts to get more information about a subject.	1	2	3	4	5
12. Use the science laboratory or lab equipment.	1	2	3	4	5
13. Explain a subject to a classmate who is having trouble understanding what to do.	1	2	3	4	5
14. Ask a classmate for help when I don't understand a problem or question.	1	2	3	4	5
15. Solve problems that come up with a health-related or science base.	1	2	3	4	5
16. Work hard in school.	1	2	3	4	5
17. Interest in school in general.	1	2	3	4	5
18. Learn on my own.	1	2	3	4	5
19. Absent from school.	1	2	3	4	5
20. Have concern about my body and physical health.	1	2	3	4	5
21. Follow the rules of the school.	1	2	3	4	5
22. Engage in school activities outside the classroom.	1	2	3	4	5
23. Am motivated to learn.	1	2	3	4	5
24. Have a feeling of self-confidence in the classroom.	1	2	3	4	5
25. Cooperate with other students.	1	2	3	4	5
26. Prefer to be the brightest in the class.	1	2	3	4	5
27. Able to apply facts learned in school to problems arising outside of school.	1	2	3	4	5

PART 2

Health Related Questionnaire

Most people know what doctors and other health professionals say about good health habits, but we also know that it is not always possible to do all the things they suggest. Please circle the number with the choice that is most like your own behavior. All responses are confidential. Please answer every item.

28. I worry about my health:
    1. always
    2. often
    3. occasionally
    4. never

29. I take vitamin or iron tablets:
    1. daily
    2. often, but not every day
    3. occasionally
    4. never

30. I eat some type of green vegetable:
    1. every day
    2. 3-6 days per week
    3. 1 or 2 days per week
    4. less often or never

31. Outside of gym class, I hike, jog, ride a bike, or engage in some other active sport:
    1. never or almost never (less than once per month)
    2. occasionally (less than once per week, but more than once per month)
    3. often (once per week or more, but not every day)
    4. every day

32. The number of small bottles or cans of soft drink (cola, sodas, punch) I drink per week is, on the average:
    1. one or fewer
    2. 2-4
    3. 5-7
    4. 8 or more

33. I usually skip breakfast:
    1. 6-7 mornings per week
    2. 4-5 mornings per week
    3. 1-3 mornings per week
    4. less than one morning per week

34. I try to eat foods from each of the "basic four" groups: dairy products, meat and eggs, fruits and vegetables, bread and cereals:
    1. 6-7 days per week
    2. 4-5 days per week
    3. 2-3 days per week
    4. 1 day per week or less

Please continue on to next page.

35. I try to decrease the amount of cholesterol in my diet by limiting the number of eggs and amount of saturated fat I eat:
    1. every time I am in a position to
    2. many times I am in a position to
    3. occasionally when I am in a position to
    4. never

36. I have a physical examination:
    1. twice or more per year
    2. once per year
    3. once every two years
    4. less than every two years

37. I have tried to convince one or more friends to quit smoking cigarettes.
    1. No
    2. Yes
    3. I have no friends who smoke cigarettes.

38. I brush my teeth:
    1. less than once per day (not every day)
    2. once per day
    3. twice per day
    4. more than twice per day

39. I usually take a bath or shower:
    1. once or twice per week or less often
    2. 3 or 4 times per week
    3. once per day
    4. more than once per day

40. The number of hours of sleep I try to get every night is:
    1. 5 or less
    2. 6 or 7
    3. 8 or 9
    4. 10 or more

41. The number of glasses of regular or non-fat milk I drink per day is:
    1. less than one
    2. 1 or 2
    3. 3 or 4
    4. 5 or more

42. If I get hungry between meals, I most often eat:
    1. candy or ice cream
    2. fruit or vegetables
    3. cookies or cake
    4. potato chips or pretzels
    5. something else
    6. I never eat between meals.

Please continue on to next page

43. The amount of non-decaffeinated coffee I drink is:
    1. more than one cup per day
    2. 5-7 cups per week
    3. 2-4 cups per week
    4. one or fewer cups per week
    5. none, I drink decaffeinated coffee only
    6. none, I don't drink coffee at all

44. I drink alcoholic beverages:
    1. frequently (more than once per month)
    2. occasionally (about once per month)
    3. seldom (less than once per month)
    4. never (or only on special family or religious occasions)

45. I try to eat so that my daily intake of calories is right for my needs:
    1. always (almost 100% of the time)
    2. usually (about 75% of the time)
    3. sometimes (about 50% of the time)
    4. seldom (about 25% of the time or less)

46. I wash my hands before eating:
    1. always (before every meal)
    2. usually (before most meals)
    3. occasionally (before few meals)
    4. never or almost never

47. I drink a glass of fruit juice or eat a fresh citrus fruit:
    1. twice per day or more
    2. about once per day
    3. about once every few days
    4. less often than this
    5. never

48. I have tried to convince one or more relatives to quit smoking cigarettes.
    1. Yes
    2. No
    3. I have no relatives who smoke cigarettes.

49. I have a dental examination:
    1. less than every two years
    2. about once every two years
    3. about once a year
    4. about twice a year or more

50. I do things that I know will endanger my health:
    1. quite often
    2. sometimes
    3. hardly ever
    4. never

51. At this point in your life, who is more responsible for your health?
    1. my parents are
    2. I am

Please continue on to next page

52. I have tried to convince younger people not to start smoking cigarettes. (
1. No
2. Yes

53. I know how to administer mouth-to-mouth resuscitation.
1. No
2. Yes

54. During the past three years, I have worked with retarded or physically handicapped people or with people in homes for the aged:
1. regularly, about once a week or more
2. periodically, on the average of once a month
3. occasionally, about every few months
4. never, or hardly ever

55. During the past three years, I have been active in efforts outside of school to improve the environment:
1. regularly, about once a week or more
2. periodically, on the average of once a month
3. occasionally, about every few months
4. never, or hardly ever

56. During the past three years, I have helped in campaigns to elect candidates for office who included on their platforms a plan for either improving the environment or bettering the health of the people:
1. Yes on one occasion
2. Yes on more than one occasion
3. No

(

57. If and when I ride in an automobile, I fasten the seat belt:
1. all of the time
2. most of the time
3. occasionally
4. never

58. During the past three years, I tried to influence others to quit cigarette smoking:
1. Yes, one person
2. Yes, more than one person
3. No

59. During the past three years, I have engaged in efforts to reduce smoking in public places:
1. Yes
2. No

You are now finished with this questionnaire. Thank you.

APPENDIX D

Teenagers' Self Test: Cigarette Smoking

DEPARTMENT OF HEALTH, EDUCATION AND WELFARE
Public Health Service
Center for Disease Control
Bureau of Health Education
Atlanta, Georgia 30333

OMB NO. 68S75038
APPROVAL EXPIRES June 1976

Place Code No. here.

TEENAGERS' SELF TEST

Cigarette Smoking

SECTION I

INSTRUCTIONS: READ EACH STATEMENT CAREFULLY BEFORE GIVING YOUR ANSWER. These are statements that some teenagers have made about cigarette smoking and cigarette smokers. Some of the statements are directly related to smoking; some are not as directly related. You may agree or disagree with these statements. After reading each statement, circle the number that most nearly shows how you feel about the statement. For example, if you strongly agree with the statement, circle the number in the column labeled "STRONGLY AGREE". If you disagree, but not very strongly, circle the number in the column labeled "DISAGREE".

(Answer every item in this section).	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
1. Adults who smoke risk getting serious lung or heart disease.	5	4	3	2	1
2. Cigarette smokers don't think enough about how their smoking bothers non-smokers.	5	4	3	2	1
3. Most girls start smoking cigarettes to try to become more popular.	5	4	3	2	1
4. People smoke cigarettes to make everyday life less boring.	1	2	3	4	5
5. Teenagers who smoke cigarettes are more likely to be troublemakers than those who don't.	5	4	3	2	1
6. I feel good knowing I can turn to my parents for advice.	5	4	3	2	1
7. Making something of my life is important to me.	5	4	3	2	1
8. It's okay for teenagers to experiment with cigarettes if they quit before it becomes a habit.	1	2	3	4	5

Please continue on to next page

(Answer every item in this section).	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
9. People can become addicted to cigarettes just as they can to alcohol or drugs.	5	4	3	2	1
10. I prefer the company of boys who don't smoke.	5	4	3	2	1
11. Most boys start smoking cigarettes because most of their friends smoke.	5	4	3	2	1
12. People smoke cigarettes to help them think more clearly.	1	2	3	4	5
13. A person who smokes is more of a follower than one who doesn't smoke.	5	4	3	2	1
14. Punishing kids for smoking cigarettes is useless.	1	2	3	4	5
15. I use my own set of values to decide what I will or will not do.	5	4	3	2	1
16. Cigarette smoking is harmful only if a person inhales.	1	2	3	4	5
17. Even though lung cancer and heart disease can be caused by other things, smoking cigarettes still makes a real difference.	5	4	3	2	1
18. It seems that more and more non-smokers complain about having someone smoke near them.	5	4	3	2	1
19. Most girls start smoking cigarettes to try to attract boys.	5	4	3	2	1
20. Smoking cigarettes can help you enjoy life more.	1	2	3	4	5
21. Kids who smoke are show-offs.	5	4	3	2	1

Please continue on to next page

(Answer every item in this section).	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
22. Adults try to stop teenagers from smoking just to show their power.	1	2	3	4	5
23. I don't want to get hooked on anything, including cigarettes.	5	4	3	2	1
24. There is no danger in smoking cigars or pipes.	1	2	3	4	5
25. Cigarette smoking can harm the health of teenagers.	5	4	3	2	1
26. Cigarette smoke smells bad.	5	4	3	2	1
27. Most boys start smoking cigarettes to try to become more popular.	5	4	3	2	1
28. Cigarette smokers are usually easy-going people.	1	2	3	4	5
29. Parents who smoke set a bad example for their children.	5	4	3	2	1
30. I often do things even when I know inside myself that they are not the right thing to do.	1	2	3	4	5
31. I can control the kind of person I will become.	5	4	3	2	1
32. Cigarettes low in tar and nicotine can't harm your health.	1	2	3	4	5
33. Cigarette smoking can harm you even after smoking for only a year.	5	4	3	2	1
34. Cigarette smokers should be kept apart from non-smokers in public places.	5	4	3	2	1
35. Most girls start smoking cigarettes because most of their friends smoke.	5	4	3	2	1

Please continue on to next page

(Answer every item in this section).	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
36. People who smoke seem to be more at ease with others.	1	2	3	4	5
37. Teenagers start to smoke as a way of rebelling against their parents.	5	4	3	2	1
38. Teenagers should do what their parents tell them to do.	5	4	3	2	1
39. I do not want to be just one of the crowd.	5	4	3	2	1
40. Teenagers who smoke regularly can quit for good any time they like.	1	2	3	4	5
41. Even if cigarettes don't kill you, they can cut down on what you might get out of life.	5	4	3	2	1
42. I prefer the company of girls who don't smoke.	5	4	3	2	1
43. Most boys start smoking cigarettes to try to attract girls.	5	4	3	2	1
44. Smoking cigarettes gives you a good feeling.	1	2	3	4	5
45. Teenage smokers think they are grown-up, but they really aren't.	5	4	3	2	1
46. It annoys me that my parents have so much control over the things I want to do.	1	2	3	4	5
47. I believe the health information about smoking is true.	5	4	3	2	1
48. If I have children, I hope they never smoke cigarettes.	5	4	3	2	1
49. If you don't smoke cigarettes, other teenagers put you down.	5	4	3	2	1
50. People smoke cigarettes to calm their nerves.	1	2	3	4	5

Please continue on to next page

(Answer every item in this section).	Strongly Agree	Agree	Neither Agree nor Disagree	Disagree	Strongly Disagree
51. People smoke cigarettes to try to escape from troubles they face.	5	4	3	2	1
52. I wish I were older than I am now.	1	2	3	4	5
53. It's better not to start smoking than to have to stop.	5	4	3	2	1
54. Cigarettes are a form of air pollution.	5	4	3	2	1
55. Students who smoke cigarettes tend to be more popular.	5	4	3	2	1
56. Smoking cigarettes seems to make good times even better.	1	2	3	4	5
57. Teenage smokers think they look cool, but they don't really.	5	4	3	2	1
58. A teenager should be able to do the things he wants to do when he wants to do them.	1	2	3	4	5
59. There's nothing wrong with smoking cigarettes as long as you don't smoke too many.	1	2	3	4	5
60. Cigarette smoking should be forbidden inside public places.	5	4	3	2	1
61. I am under pressure from my friends to smoke.	5	4	3	2	1
62. People who smoke are usually more sociable than people who don't.	1	2	3	4	5
63. Cigarette smoking is only a minor health problem.	1	2	3	4	5
64. If I smoke around other people, I take away their right to breathe clean air.	5	4	3	2	1

Please continue on to next page

SECTION II

INSTRUCTIONS: The following is a list of general information questions about you and others around you. In questions where the word "parents" appears, "parents" means mother or father or guardians you are living with now. Place a check mark next to the response that best answers each question.

---

65. How old are you now?

1______ 11 or younger
2______ 12
3______ 13
4______ 14
5______ 15
6______ 16 or older

66. Are you?

1______ Male
2______ Female

67. What grade are you in?

1______ 7th
2______ 8th
3______ 9th
4______ 10th
5______ 11th

68. How would you rate your health?

1______ Excellent
2______ Good
3______ Fair
4______ Poor

69. Do your parents (or guardians) smoke cigarettes?

1______ yes, both parents
2______ yes, father only
3______ yes, mother only
4______ no, neither parent smokes

70. How many older brothers or sisters do you have living at home?

1______ 0 (skip item #71)
2______ 1
3______ 2
4______ 3
5______ 4 or more

71. If you have older brothers or sisters living at home, how many smoke cigarettes?

1______ 0
2______ 1
3______ 2
4______ 3
5______ 4 or more

72. Of your four best friends, how many smoke cigarettes?

1______ 4 smoke
2______ 3 smoke
3______ 2 smoke
4______ 1 smokes
5______ none smokes

73. Do you think you will be smoking 5 years from now?

1______ definitely yes
2______ probably yes
3______ probably not
4______ definitely not

74. What % of adults in the United States would you guess smoke cigarettes? (Check only one)

1______ up to 20%
2______ 20% to 39%
3______ 40% to 59%
4______ 60% to 79%
5______ 80% to 100%

75. What % of teenagers your age in the United States would you guess smoke cigarettes? (Check only one)

1______ up to 20%
2______ 20% to 39%
3______ 40% to 59%
4______ 60% to 79%
5______ 80% to 100%

Please continue on to next page

76. What percent of adults in the United States would you guess have stopped smoking for good? (Check one only)

1______ up to 20%
2______ 20% to 39%
3______ 40% to 59%
4______ 60% to 79%
5______ 80% to 100%

77. How many cigarettes have you smoked in your life?

1______ none
2______ fewer than 100 cigarettes
3______ 100 or more cigarettes

78. Do you now smoke cigarettes?

1______ yes
2______ no

ONLY IF YOU NOW SMOKE CIGARETTES, ANSWER ITEMS #79, 80, AND 81.

79. About how often do you smoke?

1______ once a month or less often
2______ a few times a month
3______ a few times a week
4______ every day or just about every day

If you smoke every day or just about every day: How many cigarettes do you smoke in a day?

5______ 1 or less a day
6______ 2 to 4 a day
7______ 5 to 9 a day
8______ 10 to 19 a day
9______ 20 or more a day

80. How long have you been smoking?

1______ less than 3 months
2______ 3 months to 6 months
3______ more than 6 months but less than 1 year
4______ 1 to 2 years
5______ over 2 years

81. Do you want to stop smoking cigarettes for good, or do you want to continue?

1______ want to continue
2______ want to stop for good

EVERYONE ANSWER THE FOLLOWING:

82. Which Health Curriculum unit or units did you take? (Read all choices first, then check only one answer)

1______ None
2______ Lung & Heart & Brain
3______ Lung & Heart only
4______ Lung & Brain only
5______ Heart & Brain only
6______ Lung (5th grade) only
7______ Heart (6th grade) only
8______ Brain (7th grade) only

83. If you had any of these special units in 5th, 6th or 7th grade, how do you feel that having them influenced your decision so far about cigarette smoking?

1______ I did not have the units
2______ It kept me from smoking cigarettes
3______ It made me want to try smoking cigarettes
4______ It made me want to stop smoking cigarettes
5______ It had no influence on me one way or the other

Please continue on to next page

84. If you had these special units in 5th, 6th, or 7th grade, how do you feel that having them will influence a future decision to smoke cigarettes?

1______ I did not have the units
2______ It will prevent me from starting to smoke
3______ It will influence me to want to smoke
4______ It will influence me to stop smoking cigarettes
5______ It will have no influence on me one way or the other

85. Have you had courses in school other than the special Health units which have given you information on the dangers of cigarette smoking?

1______ no
2______yes. What were the courses?
____

86. Have you been influenced to smoke cigarettes or not to smoke by ads for cigarettes from radio, T.V., magazines, or newspapers?

1______ no, not influenced
2______ yes, influenced toward smoking
3______ yes, influenced not to smoke

87. Have you been influenced to smoke cigarettes or not to smoke by ads or articles against cigarette smoking from radio, T.V., magazines, or newspapers?

1______ no, not influenced
2______ yes, influenced toward smoking
3______ yes, influenced not to smoke

You are now finished with the test. Thank you.

APPENDIX E

Description of Scales and Items in each Scale from Teenagers' Self-Test: Cigarette Smoking

Description of Scales from Teenager's Self Test:

Cigarette Smoking

Scale 1 Health Concern, Cost: SA5 - SD1; higher score denotes agreement that smoking is harmful (non-smokers get higher scores).

item #

1. Adults who smoke risk getting serious lung or heart disease.

9. People can become addicted to cigarettes just as they can to alcohol or drugs.

17. Even though lung cancer and heart disease can be caused by other things, smoking cigarettes still makes a real difference.

25. Cigarette smoking can harm the health of teenagers.

33. Cigarette smoking can harm you even after smoking for only a year.

41. Even if cigarettes don't kill you, they can cut down on what you might get out of life.

47. I believe the health information about smoking is true.

53. It's better not to start smoking than to have to stop.

59. There's nothing wrong with smoking cigarettes as long as you don't smoke too many.

63. Cigarette smoking is only a minor health problem.

Scale 2 Non-Smokers Rights: SA5 - SD1; higher score denotes agreement with non-smokers right to breathe clean air (non-smokers get higher scores).

item #

2. Cigarette smokers don't think enough about how their smoking bothers non-smokers.

10. I prefer the company of boys who don't smoke.

18. It seems that more and more non-smokers complain about having someone smoke near them.

26. Cigarette smoke smells bad.

* Numbers refer to order of items in the experimental version of the Self Test.

34. Cigarette smokers should be kept apart from non-smokers in public places.

42. I prefer the company of girls who don't smoke.

48. If I have children, I hope they never smoke cigarettes.

54. Cigarettes are a form of air pollution.

60. Cigarette smoking should be forbidden inside public places.

64. If I smoke around other people, I take away their right to breathe clean air.

Scale 3 "Positive" Smoker Attributes: SA5 - SD1; higher score denotes agreement that smokers smoke to be popular, look grown-up, attract opposite sex, etc. (non-smokers get higher scores).

item #

3. Most girls start smoking cigarettes to try to become more popular.

11. Most boys start smoking cigarettes because most of their friends smoke.

19. Most girls start smoking cigarettes to try to attract boys.

27. Most boys start smoking cigarettes to try to become more popular.

35. Most girls start smoking cigarettes because most of their friends smoke.

43. Most boys start smoking cigarettes to try to attract girls.

49. If you don't smoke cigarettes, other teenagers put you down.

55. Students who smoke cigarettes tend to be more popular.

61. I am under pressure from my friends to smoke.

Scale 4 Direct Affect: "Benefits:" SA1 - SD5; higher score denotes disagreement with benefits of smoking such as making life easier, less boring, good feeling, calm nerves, etc. (non-smokers get higher scores).

item #

4. People smoke cigarettes to make everyday life less boring.

12. People smoke cigarettes to help them think more clearly.

20. Smoking cigarettes can help you enjoy life more.

28. Cigarette smokers are usually easy-going people.

36. People who smoke seem to be more at ease with others.

44. Smoking cigarettes gives you a good feeling.

50. People smoke cigarettes to calm their nerves.

56. Smoking cigarettes seems to make good times even better.

62. People who smoke are usually more sociable than people who don't.

Scale 5 Negative Smoker Attributes: SA5 - SD1; higher score denotes agreement that smokers are show-offs, troublemakers, think they look grown-up & cool but aren't, etc. (non-smokers get higher scores).

item #

5. Teenagers who smoke cigarettes are more likely to be troublemakers than those who don't.

13. A person who smokes is more of a follower than one who doesn't smoke.

21. Kids who smoke are show-offs.

29. Parents who smoke set a bad example for their children.

37. Teenagers start to smoke as a way of rebelling against their parents.

45. Teenage smokers think they are grown-up, but they really aren't.

51. People smoke cigarettes to try to escape from troubles they face.

57. Teenage smokers think they look cool, but they don't really.

Scale 6 Parental Control, Authority: SA1 - SD5; higher score denotes disagreement with rebellion against parents, with doing "things he wants to do when he wants to," with "doing things even if know inside they aren't right," etc. (non-smokers get higher scores).

item #

6. I feel good knowing I can turn to my parents for advice.

14. Punishing kids for smoking cigarettes is useless.

22. Adults try to stop teenagers from smoking just to show their power.

30. I often do things even when I know inside myself that they are not the right thing to do.

38. Teenagers should do what their parents tell them to do.

46. It annoys me that my parents have so much control over things I want to do.

52. I wish I were older than I am now.

58. A teenager should be able to do the things he wants to do when he wants to do them.

Scale 7 Destiny Control; Independence: SA5 - SD1; higher score denotes agreement with ability to control life, not get hooked on anything, become what one wants, etc. (non-smokers get higher scores).

item #

7. Making something of my life is important to me.

15. I use my own set of values to decide what I will or will not do.

23. I don't want to get hooked on anything, including cigarettes.

31. I can control the kind of person I will become.

39. I do not want to be just one of the crowd.

Scale 8 Rationalization: SA1 - SD5; higher score denotes disagreement with rationalizations for smoking such as "okay to experiment before it becomes a habit," "low tar & nicotine can't harm health," etc. (non-smokers get higher scores).

item #

8. It's okay for teenagers to experiment with cigarettes if they quit before it becomes a habit.

16. Cigarette smoking is harmful only if a person inhales.

24. There is no danger in smoking cigars or pipes.

32. Cigarettes low in tar and nicotine can't harm your health.

40. Teenagers who smoke regularly can quit for good any time they like.

APPENDIX F

Tables

Table F-1

Summary of Significance Tests of District Hypothesis

	Phase 1-Heart Units		Phase 2-11th Grade CONTROLS		
	Kanawha (N=92)	W. Genesee (N=52)	Bethlehem	Kanawha	W. Genesee
Knowledge Tests			(N=160)	(N=161)	
Total	---	---	**224.7	202.9	-------
Lung	---	---	** 17.4	12.9	-------
Heart	---	---	** 15.7	12.7	-------
Brain	---	---	** 15.5	12.5	-------
Health-Related Behavior			(N=172)	(N=183)	(N=156)
	---	---	53.81	53.71	54.57
Smoking Kit Attitude Scales					
Scale 1	40.62	39.99	---	---	---
Scale 2	36.16	36.23	---	---	---
Scale 3	**25.03	27.17	---	---	---
Scale 4	31.01	30.10	---	---	---
Scale 5	26.46	25.60	---	---	---
Scale 6	24.59	23.42	---	---	---
Scale 7	20.92	20.36	---	---	---
Scale 8	18.41	17.98	---	---	---
			(N=173)	(N=177)	
Percent Smokers	25.0	23.1	31.8	35.0	---
			(N=172)	(N=182)	(N=154)
School-Related Behavior	---	---	77.24	77.36	77.23

** P ∠.01

Table F-2

Summary of Significance Tests of Grade Hypothesis (Phase 2 - Kanawha CONTROLS)

	9th (N=218)	10th (N=58)	11th (N=161)
Knowledge Tests			
Total	**176.6	200.5	202.9
Lung	** 9.7	12.2	12.9
Heart	** 9.2	11.8	11.3
Brain	** 9.4	11.3	12.5
Health-Related Behavior	51.56	51.70	53.71
Smoking Kit Attitude Scales			
Scale 1	40.52	41.76	41.53
Scale 2	36.83	37.48	37.23
Scale 3	* 27.23	26.9	25.48
Scale 4	29.85	30.81	30.53
Scale 5	* 26.30	25.1	24.90
Scale 6	24.69	25.59	24.97
Scale 7	* 20.66	21.2	21.35
Scale 8	18.00	17.90	18.54
Percent Smokers	32.9	40.0	35.00
School-Related Behavior	76.92	73.35	77.36

---

* $p < .05$; ** $p < .01$

Brackets indicate groups which are significantly different from each other. Where no brackets exist, post-tests failed to show significant group differences.

Table F-4

Correlation coefficients between Health Knowledge Test Scores and Curriculum Exposure indices

	Curriculum Exposure 1		Curriculum Exposure 2	
	9th grade N=1209	10th grade N=521	9th grade N=948	10th grade N=384
Total Score	.271**	.137**	.187**	.088*
Lung Score	.273**	.119**	.212**	.088*
Heart Score	.279**	.190**	.215**	.147**
Brain Score	.174**	.088*	.126**	.018

Note: Curriculum Exposure 1 contains four groups: Controls versus single-units versus double-units versus triple-units; Curriculum Exposure 2 contains three groups: single-units versus double-units versus triple units.

* $p < .05$ level of significance

** $p < .01$ level of significance

Table F-3

Summary of Treatment and Level of Dosage Analyses for Health Knowledge Test Scores -- Means, Ns, and Significant Differences

Kanawha	Grade 9 L/H (N=118)	Grade 9 L (N=77)	Grade 9 H (N=41)	Grade 9 Controls (N=218)	Grade 10 L/H (N=58)	Grade 10 L (N=53)	Grade 10 H (N=71)	Grade 10 Controls (N=58)
Total Score	** 189.74	191.69	187.25	179.56	** 217.80	219.56	213.03	200.54
Lung Score	** 12.52	11.25	10.24	9.74	** 15.28	15.53	14.18	12.22
Heart Score	** 11.22	10.36	11.10	9.27	** 14.52	14.25	14.00	11.79
Brain Score	9.87	** 11.14	9.68	9.45	13.52	** 13.94	13.17	11.34

Bethlehem	Grade 9 L/H/B (N=181)	Grade 9 H/B (N=96)	Grade 9 B (N=28)	Grade 9 Controls (N=43)	Grade 10 H/B (N=50)	Grade 10 B (N=152)	Grade 10 Controls (N=79)
Total Score	** 209.12	195.37	185.32	195.16	225.15	215.30	216.00
Lung Score	** 14.75	11.80	10.54	12.14	17.06	15.22	15.54
Heart Score	** 14.19	12.38	9.89	11.21	** 16.00	13.32	13.24
Brain Score	** 12.46	10.60	10.39	11.67	14.70	14.20	14.16

** p ∠ .01 F-Ratio levels of significance

Note: Brackets indicate groups which are significantly different from each other as determined by post-tests. Where no brackets exist, post-tests failed to show significant group differences.

Table F-5

Summary of Comparisons Between Experimental and Control Subjects on Health Knowledge tests

	Mean Health Knowledge Test Score			
	Total	Lung	Heart	Brain
Kanawha				
Grade 9				
Experimentals (N=236)	189.94	11.71	10.92	10.25
Controls (N=218)	179.56	9.74 **	9.27 **	9.45
Grade 10				
Experimentals (N=182)	216.45	14.92	14.24	13.51
Controls (N=58)	200.54	12.22	11.79	11.34
Bethlehem				
Grade 9				
Experimentals (N=305)	202.60	13.43	13.23 *	11.69
Controls (N=43)	195.16	12.14	11.21	11.67
Grade 10				
Experimentals (N=202)	217.74	15.68	13.99	14.32
Controls (N=79)	216.00	15.54	13.24	14.16

---

* p ∠.05 level of significance
** p ∠.01 level of significance

APPENDIX G

Evaluation of National Norm Group for Use as Controls in Present Study

EVALUATION OF NATIONAL NORM GROUP FOR USE AS CONTROLS IN PRESENT STUDY

A national sample drawn in the Spring of 1973 was used as a basis for constructing norms for the Teenage Self Test. In order to use this national group as a "control", demographic differences between the national and present experimental groups which might affect the comparisons, were tested. To the extent that a demographic variable was found to have an effect on the criterion of smoking behavior, the national group would be weighted on that variable to conform to the structure of the experimental group. To accomplish this, an Automatic Interaction Detection (AID) was run with smoking behavior as the criterion variable and four demographic variables as partitioning items as follows:

- region of the country
- sex
- percentage of minority enrollment. Minority status was not available on an individual basis, but each student was assigned the value of the minority proportion for his school.* Six groupings were used (from under 11% minority to over 91% minority) with roughly equal numbers of students in each grouping.
- grade location. Students were grouped according to whether ninth grade in their schools was (1) the highest grade in their school (i.e., junior high school), (2) the lowest grade in the school (i.e., high school) or (3) an intermediate grade in the school.

Since no such relationship was found for any of the variables, the national group was used, unweighted, as a "control" group.

---

* Obtained from "Directory of Public Elementary and Secondary Schools in Selected Districts: Enrollment and Staff by Racial/Ethnic Group"; U.S. Dept. of HEW, Office for Civil Rights. OCR 74-5, Fall 1972.

APPENDIX H

Parental Consent Letter

Dear Parent:

May we have your consent for your child to take part in a Public Health Service study of the effectiveness of health education.

While children will not be asked to indicate their names on questionnaires, there will be an identification number. When the last questionnaire has been completed, the link between name and number will no longer exist. The purpose of this number is to make it possible to bring together the several questionnaires which each child will fill out at different times so that changes which occur in pupils' health knowledge, attitudes, and behavior can be observed. This list linking names and numbers will be available to the School Administrator's Office only. Thus, the response of your child will not be identified with his or her name, no one will ever be able to link the two, and it will be impossible to pass information identified with individual pupils on to anyone.

If you agree to have your child participate, please sign your name below and return the form to your child's school.

Signed____________________________
School Representative

I give my consent for ____________________________ to fill out the questionnaires relating to effectiveness of health education courses.

Signed____________________________
Parent or Guardian

APPENDIX I

Instrument Reliabilities

Instrument Reliabilities

School Related Behavior Inventory

Statistic: Reliability estimated from item-test correlations, a derivation of the Spearman Brown formula.*

$$r_{tt} = \frac{nr^2}{1+(n-1)r_{it}^2}$$

where r_{tt} = mean of correlations of items with total test scores.

n = number of

r_{it} = mean of correlations between item I and total test score, a point

Finding: $r_{tt} = .91$

Health Related Behavior Inventory

Statistic: Same as for School Related Behavior Inventory

Finding: $r_{tt} = .74$

---

* Guilford, J.P., "Fundamental Statistics in Psychology and Education. New York: Mc Graw-Hill Book Company., 1965. p. 463

Teenage Self Test: Cigarette Smoking

Statistic: Kuder Richardson Formula 20**

$$r_{tt} = \left(\frac{n}{n-1}\right)\left(\frac{\sigma_t^2 - \sum pq}{\sigma_t^2}\right)$$

where n = number of items
p = proportion responding in a specific manner
q = 1-p

Finding:

Scale	# Items	KR 20
1	10	.78
2	10	.83
3	9	.79
4	9	.70
5	8	.78
6	8	.60
7	5	.50
8	5	.50

Health Knowledge Test (Total)

Statistic: Same as above

Finding: $r_{tt} = .93$

**Op.cit. p.458